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U.S. Department of the Interior
Bureau of Land Management
Casper District Office

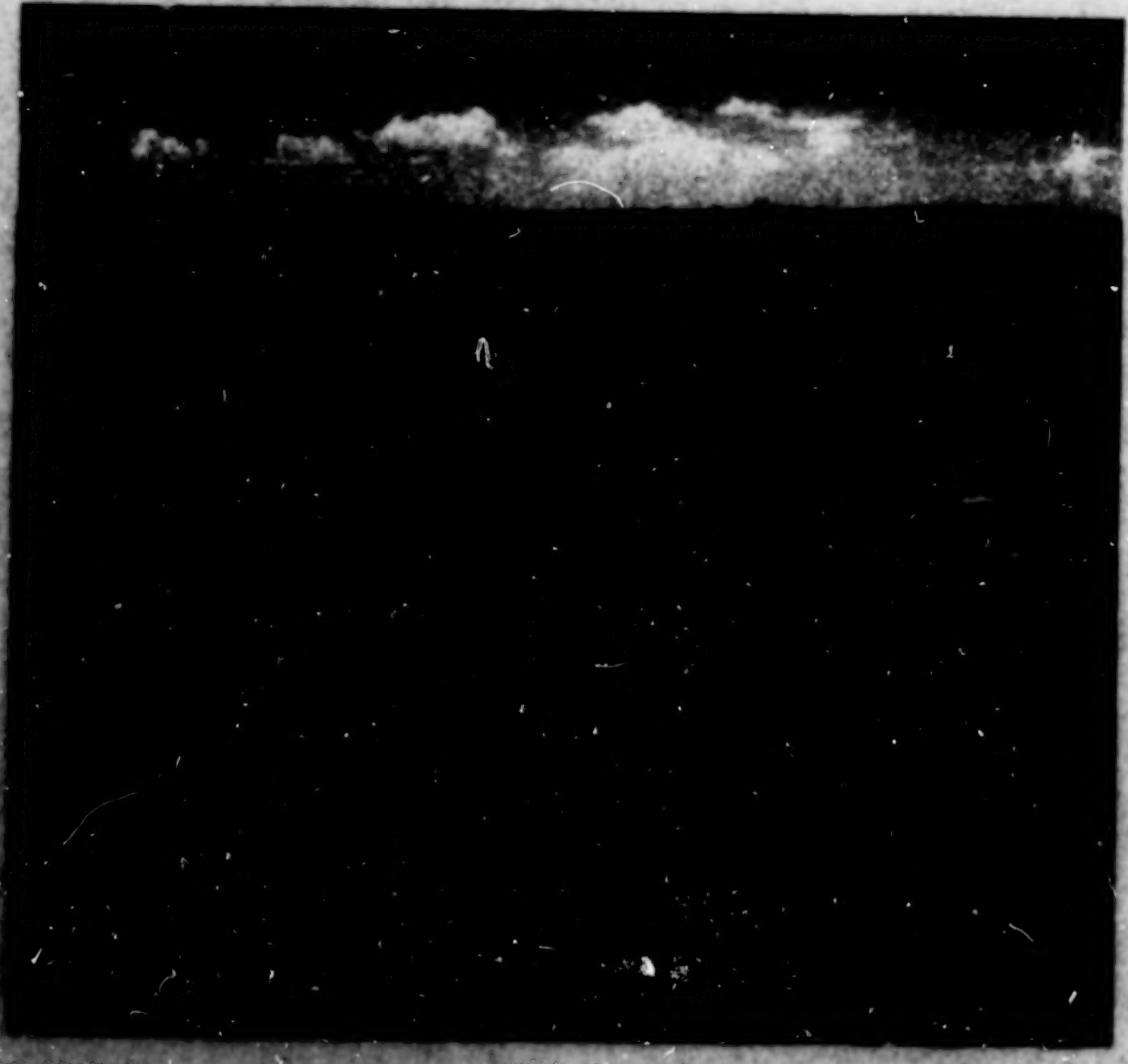
Platte River Resource Area

August 1997

The Record of Decision

Cave Gulch - Bullfrog - Waltman Natural Gas Development Project

Natrona County, Wyoming



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The Bureau of Land Management is responsible for the balanced management of the public lands and resources and their various values so that they are considered in a combination that will best serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield; a combination of uses that take into account the long term needs of future generations for renewable and nonrenewable resources. These resources include recreation, range, timber, minerals, watershed, fish and wildlife, wilderness and natural, scenic, scientific and cultural values.

I.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003-1828

In Reply Refer To:

1793 (930)

JUL 29 1997

Dear Reader:

The Record of Decision (ROD) for the *Cave Gulch-Bullfrog-Waltman (CGBW) Natural Gas Development Project* is provided for your information and use. The CGBW project area is located in Natrona County, Wyoming, within Townships 36 and 37 North (T36-37N), Ranges 86 and 87 West (R86-87W), 6th Principal Meridian. The ROD outlines the decision and rationale (including key management considerations) for the CGBW Natural Gas Development Project. This decision is subject to appeal as explained in the decision.

This ROD is the culmination of detailed analyses on the environmental effects of implementing the CGBW Operators' proposed developments or alternatives. On February 14, 1997, the Bureau of Land Management (BLM) released the Draft Environmental Impact Statement (EIS) and on June 20, 1997, the Final EIS for the CGBW Project.

The CGBW Natural Gas Development EIS and ROD were prepared pursuant to the National Environmental Policy Act and other regulations and statutes to fully disclose the potential environmental impacts which could result from implementation of the CGBW Project and to solicit public comments and concerns. The EIS process is designed to inform the public of, and provide opportunity to comment on, an action proposed for implementation on public lands, including reasonable alternatives, and to disclose through detailed analysis, potential impacts associated with implementing the proposal or alternatives, including reasonable opportunities to mitigate potential impacts.

A copy of the ROD has been sent to affected Government agencies and to those persons who indicated to BLM that they wished to receive a copy of the EIS and the ROD. Copies of the ROD are available to the public at the following locations:

Bureau of Land Management
Casper District Office
1701 East "E" Street
Casper, WY 82601

Bureau of Land Management
Wyoming State Office
5353 Yellowstone Road
Cheyenne, WY 82001

Bureau of Land Management
Platte River Resource Area
815 Connie Street
Mills, WY 82644

The BLM thanks all the individuals and organizations who provided suggestions and comments on the Draft and Final EISs. Your help has been invaluable in preparing the EIS and the attached ROD.

Sincerely,

for Alan R. Pierson
State Director

Attachment

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Wyoming State Office

RECORD OF DECISION FOR THE ENVIRONMENTAL IMPACT STATEMENT

on the

CAVE GULCH-BULLFROG-WALTMAN NATURAL GAS DEVELOPMENT PROJECT

Natrona County, Wyoming

August 1997

III

CAVE GULCH-BULLFROG-WALTMAN AREA
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LIST OF ACRONYMS/ABBREVIATIONS

Ac or ac	acres
ACEC	Area of Critical Environmental Concern
AD	administrative determination
ANS	artificial nesting structure
AO	Authorized Officer
APD	Application for Permit to Drill
AQD	Air Quality Department
bbl	barrel
BLM	Bureau of Land Management
CGBW	Cave Gulch-Bullfrog-Waltman
CIG	Colorado Interstate Gas Company
COE	U.S. Corps of Engineers
CWA	Clean Water Act
CX	categorical exclusion
DEIS	Draft Environmental Impact Statement
DEQ	Department of Environmental Quality
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERRP	Erosion, Revegatation, and Reclamation Plan
F	Fahrenheit
FEIS	Final Environmental Impact Statement
FWS	U.S. Fish and Wildlife Service
GRAA	Greater Cave Gulch Raptor Analysis Area
ID	interdisciplinary
KRA	Key Raptor Area
lbs	pounds
mm	millimeter
MSDS	Material Safety Data Sheet
NEPA	National Environmental Policy Act
NOS	Notice of Staking
NPDES	National Pollutant Discharge Elimination System
NSO	No Surface Occupancy
OSHA	Occupational Safety and Health Administration
PLS	pure live seed
POD	Plan of Development
PPP	pollution prevention plan
RCRA	Resource Conservation and Recovery Act
RMMP	Raptor Management and Monitoring Plan
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-Way
SARA	Superfund Amendments and Reauthorization
SPCC	spill prevention control and countermeasures
SPPP	Stormwater Pollution Prevention Plan
TPQ	threshold planning quantity
USDI	United States Department of the Interior
WDEQ	Wyoming Department of Environmental Quality
WGFD	Wyoming Game and Fish Department
WOGCC	Wyoming Oil and Gas Conservation Commission

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BUREAU OF LAND MANAGEMENT
CASPER DISTRICT
PLATTE RIVER RESOURCE AREA

RECORD OF DECISION
for
CAVE GULCH-BULLFROG-WALTMAN
NATURAL GAS DEVELOPMENT PROJECT
NATRONA COUNTY, WYOMING
ENVIRONMENTAL IMPACT STATEMENT

This document records the decision made by the Bureau of Land Management for managing public land surface and federal mineral estate in the *Cave Gulch-Bullfrog-Waltman Natural Gas Development Project*. The Cave Gulch-Bullfrog-Waltman project area is located in Natrona County, Wyoming within Townships 36 and 37 North (T36-37N), Ranges 86 and 87 West (R86-87W), 6th Principal Meridian. The project area encompasses approximately 25,093 acres of mixed federal, State, and private lands. Of this total, approximately 7,375 acres of surface estate are administered by the U.S. Department of the Interior (USDI), Bureau of Land Management (BLM); 1,244 acres of surface estate are managed by the State of Wyoming; and, 16,474 acres of surface estate are privately owned. Within the project area, 76.5 percent of the mineral estate is federal (19,182 acres), 3.2 percent is State (806 acres), and 20.3 percent is private (5,105 acres). See Figure 1 for the project location.

DECISION

The Bureau of Land Management approves the Cave Gulch-Bullfrog-Waltman (CGBW) Operators Proposed Action for the development and production of natural gas on public lands, as modified by the mitigation and monitoring provisions outlined herein. The decision approving the Proposed Action recognizes that the area of the CGBW project has had natural gas development since 1959, that substantial undeveloped natural gas resources still remain, and that there are other important natural resources and values within the area which require consideration and protection from unnecessary or undue degradation. Based on the environmental analysis of the Proposed Action and alternatives documented in the *Cave Gulch-Bullfrog-Waltman Natural Gas Development Project Draft Environmental Impact Statement* (DEIS), February 1997, and the *Cave Gulch-Bullfrog-Waltman Natural Gas Development Project Final Environmental Impact Statement* (FEIS), June 1997, the BLM's decision incorporates restrictions and mitigation measures in consideration of Federal, State, and local agencies, and public comments received on the DEIS and FEIS. The decision allows the development of natural gas to meet public needs, while providing maximum consideration for protection of the natural environment, to result in the least degree of an irreversible or irretrievable commitment of natural resources and values.

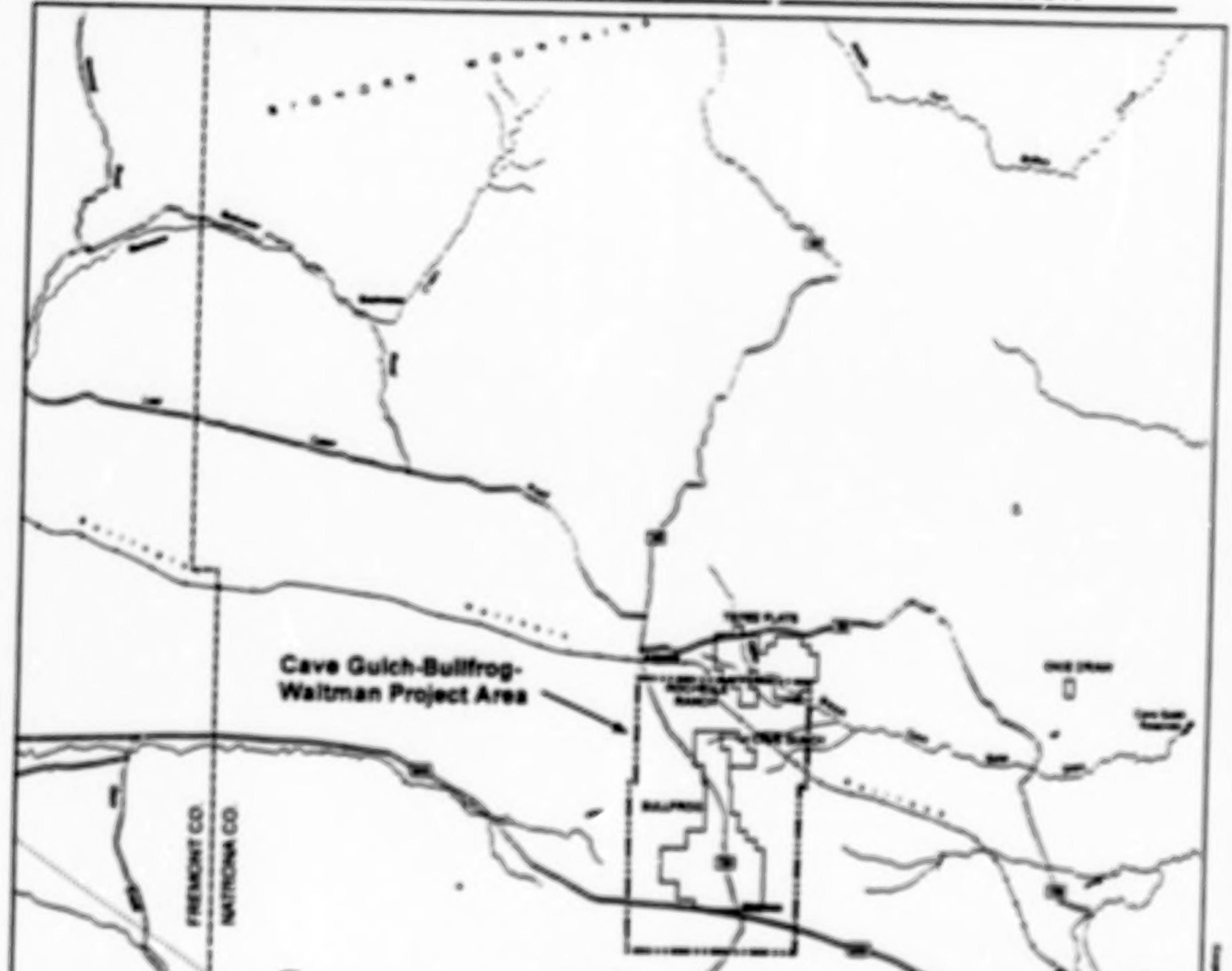

Figure 1 Area Map – Location of the Cave Gulch-Bullfrog-Waltman Project Area in Central Wyoming.

This decision applies only to the public land surface and federal mineral estate subject to administration by the BLM. All activities during the development, operation and production and abandonment phases of the project would be conducted in compliance with all applicable Federal, State and County laws, regulations, and stipulations. This decision is based on the Environmental Impact Statement (EIS) completed for the proposal. The EIS is guided by the BLM's *Platte River Resource Area, Resource Management Plan* (RMP), 1985, which describes the planning decisions for public land management within the Platte River Resource Area. Comments received during the initial scoping period, the 45-day comment period for the DEIS, and the 30-day comment period for the FEIS were taken into consideration.

The environmentally preferred alternative for the CGBW Natural Gas Development project is the Proposed Action. The BLM believes that the Proposed Action complies with the National Environmental Policy Act's (NEPA) Section 101 equally as well as Alternatives A and B. The Proposed Action: (1) best meets the BLM statutory mission under the Mineral Leasing Act and the Federal Land Policy and Management Act; (2) identifies required mitigation which includes all reasonable and practicable means to avoid or minimize environmental harm from the proposed development; and (3) includes a monitoring program to ensure implementation and maintenance of necessary mitigation.

Approval of the Proposed Action and individual project components are subject to the administrative requirements and conditions of approval listed herein, as well as the applicable applicant-committed practices and the environmental standards, procedures, and requirements specified in Appendices A and B of this Record of Decision (ROD). These measures are also set forth in Chapters 2, 4 and 5; and, Appendices A, B, and D of the DEIS; and, in Section 2 of the FEIS. The administrative requirements and conditions of approval, applicable applicant-committed practices, and the environmental standards, procedures, and requirements specified in this ROD include mitigation, stipulations, or protective measures incorporated as a result of comments received on the FEIS.

Approval of the Proposed Action and individual project components is conditioned upon and subject to the following pre-authorization administrative requirement: Before any permit is issued authorizing an action on public lands (i.e., Application for Permit to Drill, Sundry Notice, or Right-of-Way), the final location for each well site, access road, pipeline, or other facility will be evaluated site-specifically through a categorical exclusion (CX), an administrative determination (AD), or an environmental assessment (EA) in accordance with the BLM NEPA Handbook (H-1790-1). Documentation will be on BLM Forms WY-1791-06 (CX), WY-1790-06 (AD), or WY-1792-08 (EA). In rare cases, a more in-depth EA than is provided for by use of form WY-1792-08 may be required to conduct the site-specific evaluation. In addition, the pre-authorization and/or administrative requirements contained in Appendix A, Section 1, of this ROD will apply to approval of the Proposed Action and individual project components.

The DEIS, FEIS, and comment letters received on the FEIS may be reviewed by contacting the Area Manager, Platte River Resource Area at the following address: BLM Area Manager, Platte River Resource Area, P.O. Box 2420 (815 Connie Street), Mills, Wyoming 82644. A limited number of copies of the DEIS and FEIS are available for distribution beyond those provided to parties on the DEIS and FEIS mailing lists.

APPROVED PROJECT COMPONENTS

This ROD provides the BLM Platte River Resource Area Manager approval to permit the following project components to the extent they occur on public lands within the CGBW project area. Development beyond the specified levels will require the preparation of a supplemental environmental impact analysis.

- 107 new natural gas well sites
- 24 enlargements of existing well sites
- Access roads to well sites and facilities
- Gas gathering and transportation pipelines from producing wells
- 1 liquids recovery plant facility
- Ancillary facilities associated with well production, and gas gathering and transportation

- **Wells**

The drilling, completion, testing, and producing of up to 160 additional natural gas wells (from the 107 new and 24 enlarged well sites) represents all of the natural gas wells proposed for the CGBW Project area. The 160 wells are in addition to approximately 42 wells that have been drilled and developed or abandoned in the project area. The new and enlarged well sites are projected to disturb up to 313.45 acres.

- **Access Roads**

The construction and upgrading of access roads to well sites and facilities in the project area are projected to disturb up to 256.02 acres.

- **Pipelines**

The construction and operation of natural gas gathering and transportation pipelines in the project area are projected to disturb up to 183.92 acres. Gathering pipelines, including surface and buried pipelines, will be routed in a manner that best utilizes the existing topography or be parallel to existing roads in order to minimize surface disturbance.

- **Plant Facilities**

The construction and operation of a liquids recovery plant includes separator, dehydrator, and process heater equipment; compressors; generators; and, natural gas liquid storage tanks. The plant site is projected to disturb up to 10 acres.

- **Ancillary Facilities**

Construction and operation of produced water disposal equipment, individual well site compression, liquid recovery units, electrical power lines, gas metering stations, pipeline pigging facilities, field storage buildings, cathodic protection facilities, and other facilities needed to operate and produce the wells are projected to disturb up to 25 acres.

SUMMARY OF THE CGBW DEVELOPMENT PROPOSED ACTION AND ALTERNATIVES

The project, as proposed by the Operators, is to develop natural gas reserves in sandstone reservoirs in the Lance and Fort Union Formations, as well as deeper horizons (Mesaverde and Muddy Formations). A gas well drilled into the Lance Formation requires approximately 20 days to drill vertically, and a Fort Union Formation well requires approximately 7 days to drill vertically. Deeper wells would require from 35 days (Mesaverde Formation) to 240 days (Muddy Formation) drilling time. Completion operations range from a minimum of 30 days for shallow wells, to more than 60 days for deep wells.

The Proposed Action outlines the drilling plans projected by the CGBW Operators for the next ten-year planning period, and would involve drilling and developing approximately 160 natural gas wells in addition to existing drilling and production operations. The total life expectancy of the CGBW natural gas production area is estimated by the Operators to be 30 to 40 years. Drilling estimations were based on reasonably foreseeable spacing and drilling projections in portions of the project area where the planned production and development activities would occur, as well as development of related roads, pipelines, and production facilities.

The Proposed Action and three development alternatives were analyzed in the EIS. In addition, three other alternatives were considered but were not analyzed in detail in the EIS.

- **Proposed Action**

The Proposed Action would provide a maximum development scenario of approximately 160 natural gas wells on 107 new well sites and 24 enlarged existing well sites with related facilities over the next 10-year planning period (1996-2006) within the project area. The proposed development is in addition to approximately 42 wells that have been drilled and developed or abandoned in the project area.

Construction of the Proposed Action would involve 313.45 acres of well pad disturbance, 256.02 acres of new road disturbance, 183.92 acres (37.93 miles) of cross-country pipeline disturbance, and 35 acres of ancillary facility disturbance, for a total of approximately 788.39 acres. Approximately 50 percent of this disturbed area would be reclaimed. Disturbances associated with well pads would be reduced by reclaiming cut, fill, and soil stockpiling areas. This would represent an approximate reduction of 82.45 acres for all new well pads and 128.01 acres for outside road ditches. All cross-country pipeline ROWs would be reclaimed representing an approximate reduction of 183.92 acres of disturbed area, thus reducing the total disturbance by 394.38 acres to 394.01 acres. The technical requirements for the Proposed Action are described in detail in the DEIS, Chapter 2, Section 2.2.

- **Alternative A**

Alternative A would involve drilling and developing approximately 99 new wells on 97 new well sites and 2 enlarged existing well sites, with related facilities over the 10-year planning period. Development under Alternative A is in addition to approximately 42 wells that have been drilled and developed or abandoned in the project area. Within each unit, or within individual leases that are not unitized within the project area, centralized facilities would be constructed for compression, condensate or water separation, and production treatment and storage. This alternative provides for a year-round raptor stipulation for selected ferruginous hawk nests and an increased distance of the seasonal raptor stipulation for the selected ferruginous hawk nests. Under Alternative A, casual use and unusual maintenance activities would be managed during raptor nesting periods.

The technical requirements for Alternative A are the same as described for the Proposed Action. The construction of this alternative would involve 268.35 acres of well pad disturbance, 223.88 acres of new road disturbance, 142.78 acres of cross-country pipeline disturbance, and 35 acres of ancillary facility disturbance, for a total of approximately 670.01 acres. A large portion of this area would be reclaimed as described under the Proposed Action, thus reducing the total disturbance by 362.97 acres to 307.04 acres.

- **Alternative B**

Alternative B would involve drilling and developing approximately 114 new well sites with related facilities over the 10-year planning period. Under Alternative B, an area adjacent to the project area is proposed for management as a Key Raptor Area (KRA). Development of existing leases in the KRA that contain raptor nests would be subject to a seasonal raptor nesting restriction unless or until field development is proposed. If oil and gas field development is proposed in the proposed KRA, the year-round buffer, increased seasonal buffer, and unusual maintenance stipulations would have to be evaluated in an environmental assessment and selected in the decision document before being implemented. Casual uses, such as those associated with recreation, would not be managed specifically, unless there were documented disturbances to raptor nesting.

The technical requirements for Alternative B are the same as described for the Proposed Action. The construction of this alternative would involve 313.50 acres of well pad disturbance, 256.86 acres of new road disturbance, 163.35 acres of cross-country pipeline disturbance, and 35 acres of ancillary facility disturbance, for a total of approximately 768.71 acres. A large portion of this area would be reclaimed as described under the Proposed Action, thus reducing the total disturbance by 420.28 acres to 348.43 acres.

- **Alternative C - No Action**

The Council of Environmental Quality regulations implementing Section 1502.14(d) of the NEPA requires that the alternatives analysis in the EIS "include the alternative of no action" (40 CFR 1502.14 (d)). For this project, the No Action Alternative is denial of the drilling and development proposal as submitted by the Operators. However, the Department of the Interior's authority to implement a "No Action" alternative which precludes drilling is limited. An explanation of this limitation and the discretion the Department has in this regard is as follows:

An oil and gas lease grants the lessee the "right and privilege to drill for, mine, extract, remove and dispose of all oil and gas deposits" in the leased lands, subject to the terms and conditions incorporated in the lease (Form 3110-2). Because the Secretary of the Interior has the authority and responsibility to protect the environment within federal oil and gas leases, restrictions are imposed on the lease terms.

The Tenth Circuit Court of Appeals in Sierra Club vs. Peterson (717 F. 2d 1409, 1983) found that "on land leased without a No Surface Occupancy stipulation, the Department cannot deny the permit to drill...once the land is leased the Department no longer has the authority to preclude surface disturbing activity even if the environmental impact of such activity is significant. The Department can only impose mitigation measures upon a lessee who pursues surface disturbing exploration and/or drilling activities." The court goes on to say "notwithstanding the assurance that a later site specific environmental analysis will be made, in issuing these leases the Department has made an irrevocable commitment to allow some surface disturbing activities, including drilling and road building."

Leases within the CGBW project area contain various stipulations concerning surface disturbance, surface occupancy and limited surface use. In addition, the lease stipulations provide that the Department of the Interior may impose "such reasonable conditions, not inconsistent with the purposes for which (the) lease is issued, as the (BLM) may require to protect the surface of the leased lands and the environment." None of the stipulations, however, would empower the Secretary of the Interior to deny all drilling activity because of environmental concerns.

Provisions in leases that expressly provide Secretarial authority to deny or restrict Application for Permit to Drill (APD) development in whole or in part would depend on an opinion provided by the U.S. Fish and Wildlife Service (FWS) regarding impacts to endangered or threatened species or habitats of plants or animals that are listed or proposed for listing (e.g., bald eagle). If the FWS concludes that the Proposed Action and alternatives would likely jeopardize the continued existence of any endangered or threatened plant or animal species, then the APD(s) and CGBW development may be denied in whole or in part.

Based on the above explanation, this alternative would deny the proposal as submitted but would allow consideration of individual development proposals on federal lands on a case by case basis through individual project and site-specific environmental analysis. Evaluation of transport of natural gas products would also be considered on a case by case basis. Additional gas development could occur on State and private lands within the project area under APDs approved by the Wyoming Oil and Gas Conservation Commission (WOGCC).

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Alternatives considered but not analyzed in detail included the following:

- Designate the project area as an Area of Critical Environmental Concern (ACEC), with no further (or limited additional) mineral development. An ACEC constitutes a management designation through the land use planning process, and identifies a commitment to manage the designated area in such a way as to emphasize the designated values. (For the CGBW project area, the designated values would be management of raptor habitat.) By itself, designation of the project area as an ACEC does not constitute an alternative to the Proposed Action. As a result this alternative was not further evaluated in detail.

- Develop the gas resources without applying seasonal raptor management restrictions. Direct impacts to raptors while they are nesting could occur. This would be an unauthorized taking. The taking of any migratory bird, or bald or golden eagle, or the nest or eggs of any migratory bird, or bald or golden eagle, without a permit, would be in violation of Federal Law. As a result, this alternative was not further evaluated in detail.

- An alternative to removal of liquid hydrocarbons at the proposed liquids recovery plant is to transport these liquids by pipeline for processing at another location. The KN Energy Pony Express Pipeline (DEIS, Figure 1-2), once operational, could transport the "wet" gas for processing at KN's Douglas, Wyoming plant. A new CIG pipeline could be constructed to transport the gas to Rawlins for processing. Under this scenario, the pipeline company(s) would gain the economic benefits from sale of the liquids removed. Under the Proposed Action for a recovery plant, the Operators would gain the economic benefits. Decisions on how, or if, liquid hydrocarbons are to be recovered before the natural gas is transported to market are based primarily on economics.

  The BLM has no authority to require recovery of the liquids, or to specify the manner in which recovery would occur. No BLM authorization would be required if KN transported the gas to their Douglas plant, and there is no proposal before the BLM for a new CIG pipeline. Therefore, further consideration of this alternative was not warranted at this time. However, should the Operators choose not to pursue the recovery plant, the opportunity for a future new pipeline, or use of the existing pipeline does exist. A new pipeline would require further NEPA analysis.

  The location of a liquid processing plant is greatly restricted by physical and engineering constraints. Some technical constraints include the need to connect the plant to transportation pipeline systems; the need for all weather access for operational purposes; and, close proximity to producing wells due to gas and pipeline pressures and associated compression. Information submitted for the plant includes information about alternative sites that were considered, including locations on private and/or state owned surface. However, the BLM does not have the authority to require a facility to be located on nonfederal surface. Therefore, in consideration of these limitations, a detailed analysis of alternative locations other than the site proposed by the Operators was not conducted.

MANAGEMENT CONSIDERATIONS/RATIONALE FOR DECISIONS

The decision to approve the CGBW Natural Gas Development Project Proposed Action takes into account the fact that natural gas is the U.S. Congress and President's energy of choice to comply with the Clean Air Act amendments of 1990, and helps meet the public need for cleaner burning, less polluting natural gas. The development effort will help meet public needs for natural gas while at the same time resulting in the least degree of irreversible, irretrievable commitment of resources. The long-term productivity of the area will neither be lost, nor substantially reduced, as a result of approving the CGBW Natural Gas Development Project.

The decision to approve the field development Proposed Action is based on careful consideration of a number of factors, including the following: (1) consistency with land use and resource management plans; (2) public involvement, scoping issues, and EIS comments; (3) relevant resource and economic considerations; (4) agency statutory requirements; (5) national policy; and (6) measures to avoid or minimize environmental harm.

1) Consistency with Land Use and Resource Management Plans - The decision to authorize the CGBW Proposed Action is in conformance with the overall planning direction for the area. The Platte River Resource Area Resource Management Plan (USDI-BLM 1985) states that "Oil and gas exploration and development will be authorized in accordance with lease provisions. Lease constraints and development will be subject to land use decisions described in the Planning Decisions section of the RMP Record of Decision."

2) Public Involvement, Scoping Issues, and EIS Comments - Opportunity for public involvement was provided throughout the environmental analysis process. On March 19, 1996 the BLM published in the Federal Register a Notice of Intent to prepare an EIS. The scoping statement provided information on the major gas reservoir discovery at Cave Gulch and interest by seven companies to develop the natural gas. The notice also served as an announcement for an open house and public scoping meeting scheduled for April 17, 1996. The notice also stated that BLM might allow some specified development during preparation of the EIS. The public was given until May 17, 1996 to comment on the natural gas development project as well as the on the criteria that would establish the level of activity that would be allowed while the EIS was underway. Copies of the scoping statement, press releases and letters were mailed to the media, governmental agencies, environmental organizations, industry representatives, individuals, landowners and grazing permittees.

The joint public meeting and open house was attended by 248 persons, of that, 30 persons gave public statements. Some 63 comment letters were received. All comments received were incorporated into the analysis of issues identified in the DEIS.

The issues were to allow interim development while the EIS was prepared; concerns on too much or too little studies and monitoring; concerns with recreation and wildlife management; the consideration of the social-economic benefits from the Proposed Action; the alternatives to be analyzed; the size of the area of analysis; correlative rights; and, general questions on the process for preparing an EIS.

On February 12, 1997, a press release was issued announcing the availability of the DEIS, a summary of the analysis and alternatives, deadline for comments, and announcing the scheduled March 11, 1997 public meeting and open house. On February 14, 1997, the Environmental Protection Agency Notice of Availability of the Draft EIS (DEIS) was published in the Federal Register. Over 600 copies of the DEIS were made available to the public and interested agencies for a 45-day public comment period. On February 20, 1997, the BLM published a Federal Register notice of availability and notice of an open house and public meeting scheduled for March 11, 1997 to accept comments and entertain questions. On March 3, 1997, a follow up press release was mailed to the media on the meeting set for the DEIS. About 136 persons attended the public meeting, and 27 persons provided comment. A transcript of the meeting comments is available for public review at the Casper District Office, 1701 East E Street, Casper, WY. The date by which the comments on the DEIS had to be received was April 1, 1997.

Sixty-five comment letters were received on the DEIS. The comment letters and the BLM's responses to the comments are contained in Sections 4 and 5, respectively, of the FEIS.

The FEIS was distributed to the public for review and comment on June 13, 1997. Notices of availability of the FEIS appeared in a press release issued June 13, 1997; a BLM-prepared Federal Register Notice on June 19, 1997; and, an Environmental Protection Agency-prepared Federal Register Notice on June 20, 1997. Approximately 400 copies of the FEIS were mailed to federal, state, and local government agencies, organizations, industries and individuals. The official FEIS 30-day comment period ended July 21, 1997.

Nineteen representatives of Native American Indian Tribes were notified by registered mail of the availability of the FEIS and their opportunity to provide comment, and they were mailed copies of the FEIS. The following Native American Indians were included in the mailing list: Crow, Arapaho, Northern Cheyenne, Shoshone, Eastern Shoshone, Northern Arapaho, Northern Cheyenne, and Ogallala Sioux. The Medicine Wheel Alliance was also sent a copy. Additional consultation and coordination was deemed unnecessary because none of the cultural resources discovered in the project area are of the type, density or distribution to suggest that there is any potential for the presence of Native American sacred sites or Traditional Cultural Properties. Instead, the known site inventory consists of routine domestic and utilitarian debris which lies well below the threshold of materials that would invoke evaluation as potential Traditional Cultural Properties. No written comments from Native Americans were received during the comment period for either the DEIS or FEIS.

The BLM received 5 letters commenting on the FEIS during the public comment period. All written comments were considered by the BLM in the preparation of the DEIS and FEIS, and in the preparation of this ROD. The comments received on the FEIS may be reviewed by contacting the BLM Area Manager, Mills, Wyoming.

The comments received on the CGBW FEIS did not include any new substantive information that necessitated revisions to the EIS. In summary, the common concerns were with BLM's responses to comments in the FEIS; support for the project because of the revenues that would be generated; the cumulative analysis on wildlife; and, concerns with the protection of ground and surface water resources.

The comments that provided specific information on air quality, pit liners, soil stabilization, the raptor mitigation, and possible correction of information in the FEIS were considered in reaching the decisions set forth in this ROD.

Written comments on the FEIS were received from the following:

- State of Wyoming
  - Office of State Lands & Investments
  - Wyoming Game & Fish Department
- United States Environmental Protection Agency
  - Region V111
- People for the West! State of Wyoming
- J.A. Rohn Consulting, Representing
  - Barrett Resources Corporation
- Chevron U.S.A. Production Company
- Renee C. Taylor

3) Relevant Resource and Economic Considerations - Several of the commentors on the Draft EIS and Final EIS raised similar concerns. The following areas of concern summarize those most commonly expressed by commentors. The BLM has considered these concerns in the process of reaching this decision, as summarized below. These have also been addressed in the FEIS.

- *The cumulative impacts to air quality resulting from the Cave Gulch-Bullfrog-Waltman Natural Gas Development Project and numerous other proposed oil and gas activities in central Wyoming are not being adequately evaluated.*

- *The combined amount and type of mitigation restrictions proposed in the DEIS for the protection of raptors is excessive and will result in project construction and development crews being unable to work during six months out of the year.*

- *The DEIS did not adequately analyze the socioeconomic impacts of the seasonal restrictions for the Proposed Action and Alternatives.*

- *The DEIS did not adequately identify the significance of the potential revenue impacts of the Proposed Action and Alternatives on Natrona County and the Natrona County School District.*

- *The BLM failed to designate Natrona County as a "Cooperating Agency" under the National Environmental Policy Act and the Council on Environmental Quality regulations even though precedence has been set in other states and counties.*

The assessment of air quality impacts provided in the DEIS and FEIS considered cumulative impacts from the standpoint of assessing the potential impacts from all existing, reasonably foreseeable and proposed sources of emissions. A wide range of mitigation measures was presented in the EIS, and the selected mitigation actions were chosen on the basis of their adequacy to offset or minimize the impacts anticipated from the Proposed Action, and to comply with Federal laws, State statutes, and BLM policy. Clarifications of the potential socioeconomic impacts of the seasonal restrictions are provided in the errata items for Section 4.11.3.1 and Section 4.11.4 in the FEIS. The DEIS (Section 4.11.3.1.11) provides a detailed discussion of the amount and types of tax revenues which would be generated by activities associated with the Proposed Action. The decision not to sign the "cooperating agency" agreement as drafted and submitted by Natrona County complies with the legal parameters for such agreements. The BLM/County agreements signed in other States have set no precedence because they are within the legal parameters.

4) Agency Statutory Requirements - The decision is consistent with all Federal, State, and County authorizing actions required to implement the Operator's Proposed Action (see DEIS Table 1-7 and FEIS page 2-9.) All pertinent statutory requirements applicable to this proposal were considered. These include consultation with the FWS regarding threatened, endangered, and candidate species; consultation with the Army Corp of Engineers; coordination with the State of Wyoming regarding wildlife, environmental quality, and oil and gas conservation; and Natrona County Commissioners for coordination of construction and use permits.

5) National Policy - Private exploration and development of federal oil and gas leases is an integral part of the BLM oil and gas leasing program under authority of the Mineral Leasing Act of 1920 and the Federal Land Policy and Management Act of 1976. Natural gas is the "energy-of-choice" by the Congress and President because it is clean burning and less polluting. Therefore, the decision is consistent with national policy.

6) Measures To Avoid or Minimize Environmental Harm - The adoption of the mitigation measures identified in the Cave Gulch-Bullfrog-Waltman Draft and Final EISs and contained in Appendices A and B of this decision represent all practicable means to avoid or minimize environmental harm.

COMPLIANCE AND MONITORING

Because of the importance of mitigation for avoiding or minimizing adverse impacts, a monitoring program shall be implemented by the CGBW Operators and/or BLM. Guidelines for monitoring are set forth in Appendices A and B of this decision. The BLM in coordination with the Operators or their contractor will conduct monitoring in accordance with the provisions of this decision. The Operators and/or the BLM will provide qualified representatives to monitor and validate construction and reclamation, and provide for compliance commensurate with this decision.

The EIS prepared on the CGBW Natural Gas Development proposal will guide implementation of the natural gas development; however, it is not the final environmental review upon which approval of all actions in the area will be based. Site specific evaluations will be required for each well and associated access roads, pipelines, and other actions in accordance with the BLM National Environmental Policy Act Handbook (H-1790-1). This provision for site specific evaluation of environmental protection needs wil ensure that there is optimum consideration given to resource protection.

APPEAL

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR 3165.4(c). If an appeal is filed, your notice of appeal must be filed in this office (Bureau of Land Management, State Director, P.O. Box 1828, Cheyenne, Wyoming 82003) within 30 days of the date BLM publishes their notice of the decision in the *Casper Star Tribune*. The BLM notice is expected to be published the week of August 4, 1997. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition (pursuant to regulation 43 CFR 3165.4(c) for a stay (suspension) of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed in 43 CFR 3165.4(c). Copies of the notice of appeal and petition for a stay must also be submitted to the Interior Board of Land Appeals and to the appropriate office of the Solicitor at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Alan R Kesterke
State Director

JUL 29 1997
Date

APPENDIX A

ENVIRONMENTAL STANDARDS, PROCEDURES, AND REQUIREMENTS FOR IMPLEMENTATION OF THE CAVE GULCH - BULLFROG - WALTMAN NATURAL GAS DEVELOPMENT PROJECT

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APPENDIX A

ENVIRONMENTAL STANDARDS, PROCEDURES AND REQUIREMENTS FOR IMPLEMENTATION OF THE CAVE GULCH - BULLFROG - WALTMAN NATURAL GAS DEVELOPMENT PROJECT

This Appendix is divided into three sections as follows:

Section I: General Pre-Authorization and/or Other Administrative Requirements

Section II: Applicable Applicant-Committed Construction, Operation, and Resource Protection Practices, and Applicable EIS-Identified Mitigation and Monitoring Measures

Section III: Reclamation Guidelines

SECTION I

GENERAL PRE-AUTHORIZATION AND/OR OTHER ADMINISTRATIVE REQUIREMENTS

The Cave Gulch-Bullfrog-Waltman (CGBW) Operators and their contractors and subcontractors would conduct operations in full compliance with applicable Federal, State, and local laws and regulations, and within the guidelines/stipulations specified in the ROD, APDs, ROW grants, and other permits issued by BLM.

The standards, procedures and requirements described in this Appendix are taken from BLM State and District standards (including the Wyoming BLM Standard Mitigation Guidelines for Surface Disturbing Activities), and the Platte River Resource Area Resource Management Plan (RMP). Permit applications refer to APDs, Sundry Notices, ROW applications, and other required BLM applications.

The standard operating procedures for surface-disturbing activities must be adhered to during all proposed activities unless an Authorized Officer (AO)-approved written exception has been granted. Exceptions would only be granted in cases where adherence to standard procedures is not possible or necessary, and the project is acceptable with proper mitigation.

In accordance with BLM regulation 43 CFR 3162.1(a) and Onshore Orders, the CGBW Operators will be responsible for the compliance of its employees, contractors, and subcontractors with the terms and conditions of all permits, agreements, and mitigation measures described in this ROD. Each contractor and subcontractor will be required to maintain up-to-date plans and specifications at construction sites.

The CGBW Operators will keep livestock operators and land owners informed of construction activities. During construction, the Operators will require their contractors to regulate access and vehicular traffic as necessary to protect the public and livestock from hazards associated with construction. The Operators will conduct all activities in compliance with the terms and conditions of the *Cave Gulch-Bullfrog-Waltman Natural Gas Development Project Record of Decision* and all applicable Federal, State, and local regulations. The Operators will implement all mitigation measures developed in conjunction with the Cave Gulch-Bullfrog-Waltman EIS brought forward into the ROD and Appendices A and B.

All phases of the proposed project including well location, road and pipeline construction, drilling and completion operations, maintenance, and reclamation will be conducted by the Operators and their subcontractors in full compliance with all applicable Federal, State, and local laws and regulations and within the guidelines specified in approved APDs, ROW permits, and site-specific evaluations and Decision Records (i.e., individual well location, road, pipeline, and ancillary facility evaluations).

The Operators will comply with existing Federal, State, and County requirements and restrictions developed to protect road networks and the traveling public. Special arrangements will be made with the Wyoming Highway Department, as required, to transport oversize loads to the EIS area. Otherwise, load limits will be observed at all times to prevent damage to existing road surfaces.

Authorization to Proceed

The BLM Platte River Resource Area Manager will be the AO for the proposed project. Mitigation and monitoring measures identified in this Appendix may be modified by the AO based on new information or to further minimize impacts. Interdisciplinary team recommendations will be developed during field site analyses, conducted during APD, Sundry Notice, and ROW reviews, and presented to the AO. Final mitigation and monitoring requirements will be determined by the AO.

Site-specific plans/reports (e.g., road and well design plans; erosion control and revegetation plans; cultural clearance; special status plant species clearance; etc.) will be developed by the Operators as appropriate and submitted with each APD, ROW application, or Sundry Notice. Concurrent interdisciplinary team on-site evaluations will also be conducted.

Approval of individual project components (i.e., wells, roads, pipelines, and ancillary facilities) for the project area will be contingent upon completion of a site-specific cultural resource file search and Class III cultural clearance, paleontological clearance, T&E and candidate species surveys, site-specific CX/AD/EA, and Decision Records for each well, road, pipeline, or other facility unless otherwise provided by the AO.

Prior to constructing a project component, the Operators will prepare an APD, ROW, or appropriate permit application which will define and map specific locations where site-specific mitigation and environmental protection measures called for in this Appendix will be implemented. Final locations for these measures would be confirmed by BLM and the appropriate operator(s) following on-site inspections of project locations. Individual APDs, ROW, or permit applications will discuss configuration of the reshaped topography, drainage systems, segregation of spoil materials, surface manipulations, waste disposal, and soil treatments. An estimated time for commencement and completion of reclamation operations will also be included.

APPENDIX A

The APD, ROW, or permit application will include maps and diagrams showing the following information, as applicable:

- Pipeline alignments relative to existing and proposed roads;
- Well pad locations relative to existing pads and roads;
- Well pad designs;
- Roads that will be used to access the project area;
- Proposed road designs;
- Any temporary use areas or road pullouts;
- Areas with special terrain conditions (e.g, steep slopes);
- Other areas with special conditions such as proximity to drainages or cultural resources;
- Specific locations where mitigation measures would be implemented (e.g., mulching, waterbars);
- Crossings of intermittent drainages;
- Areas of grading and stripped vegetation;
- Topsoil stockpiles;
- Sediment control measures;
- Location of crucial habitats, and other resources which could result in seasonal constraints on proposed activities; and
- Production Facilities Diagram.

SECTION II

APPLICABLE APPLICANT-COMMITTED CONSTRUCTION, OPERATION, AND RESOURCE PROTECTION PRACTICES, AND APPLICABLE EIS-IDENTIFIED MITIGATION AND MONITORING MEASURES

The following lists the applicable construction, operation, reclamation, abandonment practices, and project-wide mitigation measures that the CGBW Operators committed to implementing during the development of their project, as described in the Proposed Action section of Chapter 2 of the *Cave Gulch-Bullfrog-Waltman Natural Gas Development Project* DEIS, and Section 2 of the FEIS. Operator-committed practices or measures not consistent with accepted standards, or that are changed as a result of the EIS, are not listed. Brackets [ ] indicate an addition for clarification or where some aspect of the Proposed Action is dropped or changed and the applicable measure is referenced. Where parts of the Operators' Proposed Action would repeat information included in previous sections of this ROD, brackets are not used. The practices and measures included in this section, and in Sections I and III of this ROD Appendix A, and those in Appendix B of this ROD, take precedence over any discrepancies between practices and measures in the DEIS Appendix A (Master Surface Use Plan, and Natural Gas Pipeline Construction Master Plan).

The *Cave Gulch-Bullfrog-Waltman Natural Gas Development Project Draft and Final EISs* identified additional mitigation opportunities in Chapters 4 and 5 of the DEIS and Section 2 of the FEIS to reduce impacts on certain resources. Those measures considered reasonable for Operator and/or BLM implementation are brought forward from the EIS into this section, and are listed as additional measures or measures replacing operator measures. Some measures are not within the administrative authority of the BLM to require and are therefore identified as measures the Operators "could" or "should" implement.

The following environmental protection practices, standards, procedures and requirements specified in the three sections in Appendix A and those is Appendix B will be incorporated into the development of the project area through the permitting process (Application for Permit to Drill (APD), Right-of-Way (ROW), or other permit) as appropriate for each proposed well, access road, pipeline, central facility, etc.

1.0 PRECONSTRUCTION PLANNING AND SITE LAYOUT

The Operators would follow the procedures outlined below to gain approval for the proposed activity on *public lands* within the project area. Development activities proposed on private and State of Wyoming surface lands would be approved by the Wyoming Oil and Gas Conservation Commission (WOGCC). The WOGCC permitting procedures require filing an APD with the WOGCC and obtaining a ROW from the surface owner.

- Prior to the start of construction activities, the Operators would submit a Notice of Staking (NOS)/APD/Sundry Notice/ROW Application to the BLM with a map showing the specific location of the proposed activity, (e.g., individual drill sites, pipeline corridors, access roads, or other facilities). The applicant, BLM, and affected surface landowner would conduct an on-site evaluation during which specific construction measures, erosion control needs, design specifications, resource concerns, etc. would be identified and likely conditions of approval specified. Following the on-site evaluation, the applicant would file the application which would include site-specific construction plans where necessary to describe the proposed development (i.e., drilling plans with casing/cementing program; surface use plan with detailed engineering design, reclamation plans, etc.).

- More detailed construction plans, when required by the BLM for proposed development in areas of steep slopes, historic trails, riparian areas, etc., would be submitted to the BLM by the applicant. The plans would address concerns that may exist concerning construction standards, required mitigation, etc. Negotiation of these plans between the proponent and BLM, if necessary to resolve differences, would be based on field inspection findings and would take place either during or after the BLM on-site inspection.

- The applicant would revise the APD/Sundry Notice/ROW Application as necessary per negotiations with the BLM. The BLM would then approve the specific proposal and attached Conditions of Approval or stipulations to the permit. The applicant then has one year within which to commence activity under an APD.

- Prior to approval, the proposed well site, access road, pipeline corridor, or other sites must be cleared for cultural values, special status plants and animals, paleontological values, nesting raptors, sage grouse, etc. If found, appropriate mitigation would be applied.

2.0 CONSTRUCTION AND DRILLING PHASE

2.1 Access Road Construction

The primary road access utilized by the Operators is Wyoming State Highway 20/26 which crosses the southern part of the project area, and Natrona County Road No. 104. Additional access is provided to the interior of the project area by an existing road network developed to service on-going drilling and production activities.

BLM Manual Section 9113 road classifications categorize CGBW project area roads into three separate classes:

1) Collector Roads. These roads normally provide primary access to large blocks of land and connect with, or are extensions of, a public road system such as Wyoming State Highway 20/26. Collector roads are two-lane and require application of the highest road standards. The predominant design speed is 30 to 50 mph depending on terrain and/or as determined by BLM, and the subgrade width is a minimum of 24 feet (20 feet full-surfaced travelway). Proposed design speeds are shown in [DEIS] Figure 2-2.

2) Local Roads. These are low volume roads providing the internal access network within an oil/gas field. The design speed is 20-50 mph depending on terrain, and the subgrade width is normally 24 feet (20 feet full-surfaced travelway). Low volume roads in mountainous terrain may be single-lane roads with turnouts.

3) Resource Roads. These are normally spur roads that provide point access. Roads servicing individual oil/gas exploration and production locations fall within this classification. The road has a design speed of 15-30 mph and is constructed to a minimum subgrade of 16 feet (12 feet minimum full-surfaced travelway) with intervisible turnouts.

All new access roads within the project area would be constructed for the specific purpose of natural gas field development. Roads will be located to minimize disturbances and maximize transportation efficiency. Where appropriate, and considering such factors as road location, and favorable weather and terrain conditions, the Operators propose to construct natural surface roadways to these well sites to reduce environmental impacts (i.e., soil and vegetation disturbance) and the amount of reclamation. New access roads will be designed and constructed to resource road standards to facilitate reclamation should the well be a dry hole. The Operators propose to construct access roads across public lands to productive wells in accordance with BLM Manual 9113 standards. Roads located on private lands would be constructed in accordance with standards imposed by the private land owner. The number of roads would be limited to decrease potential impacts by discouraging development of looped roads and by accessing wells from short resource roads off the local roads. Roads will be closed and reclaimed by the Operators when they are no longer required for production operations, unless otherwise directed by the BLM or private landowners. Roads will be designed to minimize disturbance and will be built and maintained as specified by the BLM to provide safe operating conditions at all times. The minimum full surfaced travelway width for resource access roads will be 16 feet. Surface disturbance will be contained within the road ROW and will average 40 feet for resource roads. A [illegible] roadway cross-section with width specifications is shown in [DEIS] Figure 2-3.

2.2 Well Pad Design and Construction

The traditional single-well pad design has been primarily utilized in the project area in the past and will continue to be the predominant drill site design utilized under the Proposed Action, except in Sections 30, 31, and 32.

As discussed in [DEIS] Section 2.1, the Operators would utilize a two-well pad for 20-acre development and occasionally to test and develop deep horizons and to twin certain existing wells where needed. The size of well pads would depend on available drill rigs, terrain limitations at each individual drill site location, and the total depth to which the test well would be drilled. Single, shallow well pads would be constructed from native materials located at the site and would occupy an area of approximately 2.0 acres (350 feet by 250 feet) as shown on [DEIS] Figure 2-5. With inclusion of areas of cut and fill and soil stockpiling, the total disturbed area would be approximately 2.75 acres per well pad. New twin shallow well pads would occupy an area of approximately 400 feet by 220 feet and single deep well pads would occupy an area of approximately 300 feet by 450 feet as shown on [DEIS] Figure 2-6. Where 24 new wells would be drilled from existing well pads, the single well pads may require enlargement of as much as 100 feet by 350 feet. Actual well pad size will be shown on each individual well site APD. Each well pad will be designed so that construction materials will balance as close as possible (i.e., soil materials taken from cuts will be about the same quantity as that needed for fill to construct a level pad), while attempting to minimize the total disturbed area.

As discussed under [DEIS] Section 2.1, anticipated 20-acre development in the north part of the project area would be developed with 2 wellbores per pad, where feasible. Drilling two wells per management plans; (2) public involvement, scoping issues, and EIS comments; (3) relevant resource and economic considerations; (4) agency statutory requirements; (5) national policy; and (6) measures to avoid or minimize environmental harm.

1) Consistency with Land Use and Resource Management Plans - The decision to authorize the CGBW Proposed Action is in conformance with the overall planning direction for the area. The Platte River Resource Area Resource Management Plan (USDI-BLM 1985) states that "Oil and pad may require expanding the well pad size by approximately 100 feet, adding an extension to the existing reserve pit and locating the drill rig and support equipment approximately 100 feet from the initial wellbore. In some instances, the two wells may be drilled concurrently before completion operations commence. In those cases, the well pad may only be enlarged a nominal amount, up to 25 feet in one direction. Topsoil suitable for reclamation will be stripped to a depth of 6 to 8 inches, [up to 12 inches] if available, from the well pad area and stockpiled adjacent to the well pad. The location of the topsoil stockpile will be designated on the well pad design plan in the APD. Cut and fill slopes would be designed, if deemed necessary, in a manner that will hold topsoil during reclamation and to facilitate subsequent re-establishment of vegetation. Well pad construction and related facilities would usually require approximately 6 to 8 days to complete, depending on site and terrain limitations. Construction practices would involve use of standard earthmoving equipment such as bulldozers, scrapers, backhoes, and graders.

Components of the well pad include drilling of a rathole and mousehole, construction of a reserve pit to temporarily store drilling fluids, cuttings, and water produced during drilling and testing, and a flare pit. Reserve pits will be constructed so that a minimum of one-half of the total depth is below the original ground surface on the lowest point within the pit. To prevent seepage of fluids, drilling mud gel or poly liners will be utilized to line reserve pits [see ROD Appendix A, Section II, Project-Wide Mitigation Measures, Item 8.4, Water Resources subsection]. Liners will be of sufficient strength and thickness to withstand normal installation and use. The liner will be impermeable (i.e., having a permeability of less than 10 to the minus 7 cm/sec) and be chemically compatible with all substances which may be put into the pit. [If a poly liner is used, the liner will be rolled into place and secured at the ends, i.e., buried in the top of the pit berms (see DEIS, Appendix A, page A1-3)]

All reserve pits will be fenced with sheep tight wire on 3 sides immediately following construction. The fencing will remain in place as long as drilling operations are ongoing. The fourth side of the reserve pit will be fenced at the time the rig substructure is moved from the drill site location to minimize the potential for loss of wildlife and domestic animals.

Any hydrocarbons floating on the surface of the reserve pit will be removed as soon as possible after drilling operations are complete. Reserve pit fluids will be allowed to dry by evaporation for approximately one year prior to reserve pit closure and drill site reclamation. BLM regulations allow placement of production water in reserve pits for periods up to 90 days [following initial completion of a well]. When the pit is backfilled, cuttings and drilling muds will be covered to a depth of at least three feet. If drilling or production fluids remain in the pit after one year, alternate methods of drying, removal of the fluids, or other treatment measures will be determined by the Operators in consultation with the BLM. Necessary permits will be acquired by the Operators if fluids are transported off-site for disposal. Reserve pits containing hydrocarbons will be netted or [otherwise secured].

Service trailers located on the well pad will be self-contained and will not require a septic system. Sewage will be hauled off-site to a State Department of Environmental Quality (DEQ) approved disposal site.

If a well is productive, site erosion and off-site sedimentation will be controlled by promptly revegetating sites in the first appropriate season (fall or spring) after drilling, and providing surface water drainage controls, such as berms, sediment collection traps, diversion ditches and erosion stops as needed. These measures will be described in the individual APD/ROW.

2.3 Drilling Operations

Each drilling operation would require transport of approximately 25 truckloads of drilling-related equipment and materials to facilitate the drilling operation. This number includes transportation of the drill rig, drill pipe, drilling fluid products, and related support equipment, but does not include the truck traffic required for resupplying the operation (e.g., fuel, drilling fluid additives, etc.). Additional traffic would be variable, depending on the phases of the drilling operation, but should not include more than six or seven vehicles per day per drill site throughout the drilling operation. Total rig-up activities and installation of ancillary facilities would take approximately 3 days to complete.

Most of the drilling would occur in the first 10 years of the project, with the majority of shallow wells drilled in the first five years. Some drilling may occur after the initial 10 year period. All Operators involved in the project would be very active in drilling up acreage during the first 2 to 3 years. After that point, it is expected that drilling activity would slow considerably. The number of wells drilled each year would depend on the number of rigs used. Completion operations for each productive well would commence as soon as possible after the drilling rig moves off location.

Water, for drilling and service trailer use, will be obtained from State of Wyoming approved locations or local water source wells. Water requirements for drilling average approximately 11,000 barrels (bbls) per well (462,000 gallons). The Operators intend to use freshwater-based mud for the majority of their drilling operations.

Methods used for the disposal of produced water (water produced in association with the oil and gas which is separated out at the well location) will vary with each operator but would generally be accomplished by either (1) disposal in an underground injection well, (2) surface discharge, or (3) surface evaporation in lined or unlined ponds. Fort Union and Lance Formation water would meet the criteria for disposal under an National Pollution Discharge Elimination System (NPDES) permit. Each operator will obtain the permit(s) necessary for the selected disposal method. Depending on timing of availability, quantity, and quality of produced water, some of the produced water could be used in well drilling and completion, and pipeline construction and hydrostatic testing.

2.4 Pipeline Construction

New gas gathering lines would be constructed to facilitate transportation of natural gas. Gas would be gathered from each producing well by means of a gathering line. Size of the gathering line will be dependent on the production rate at each well. More than one gathering line would be necessary to allow for wet gas and dry gas segregation at the wells. A larger (10-inch) distribution line was built along existing corridors in the fall of 1996.

The gathering lines would generally be constructed in the access road corridors to each well except where limited by topographic features, however, some cross-country construction may occur. Also, not all gathering lines would be buried. Some pipelines may be constructed on the ground surface where terrain limitations such as sensitive soils, steep slopes, and important cultural resources values prohibit burying the pipeline in a trench. When more than one gathering line is required for production, both lines would be laid in a common ditch.

The actual pipeline location will be surveyed and staked prior to start of any construction activities. The company installing the pipeline will submit detailed design plans when required by the BLM for pipeline(s) planned on slopes 25 percent or greater. In order to minimize the total amount of surface disturbance, the pipeline corridor may or may not be cleared of heavy brush prior to any activities. This determination will be made by the BLM prior to construction and will consider factors such as construction crew safety concerns, sideslopes, and brush density. Stripping of topsoil from the pipeline corridor would not be performed. Pipeline construction would occur in a planned sequence of operations common to natural gas pipeline installation specifications and would take place along a corridor of continuous activity. All pipeline installation work would be completed by a contractor working under the supervision of the pipeline company. Construction activities will be confined to the 40-foot ROW.

The pipeline trench would be excavated mechanically with trenching equipment such as a backhoe or trencher. The width of the trench would be approximately 18 - 24 inches. The trench would be constructed to a minimum depth to maintain 36 inches of normal soil cover and 24 inches of cover in consolidated rock.

Pipe laying activities would include pipe stringing, bending, welding, coating, lowering of pipeline sections, and backfilling. The newly-constructed pipelines will be tested to prove structural soundness using either inert gas or hydrostatically tested with water. Integrity tests will be conducted in full compliance with the mandatory BLM ROW stipulations. Gas-testing procedures are summarized as follows. Certified pipeline welders are utilized during pipeline construction to assure high quality work. Ten percent of the pipeline is randomly x-rayed after welding to check the quality of the welds. All fittings on the pipeline are also x-rayed. The pipeline is slowly pressured-up with produced gas to the maximum operating pressure of the pipeline being tied into. This pressure is maintained for 24 hours, then the natural gas is released to sales. If a leak is discovered, the pipeline is purged to the atmosphere, the pipeline repaired, and the pressure tested again by the same procedures.

Necessary water appropriation permits will be obtained from the Wyoming State Engineer's Office. Water would be taken from local water sources near the analysis area. After testing operations are completed, the water would be pumped into water hauling trucks and transported to drilling locations within the project area to be used in conjunction with the drilling operations. If not needed for drilling operations, the test water would be disposed of onto undisturbed land having vegetative cover or into an established drainage channel in a manner as not to cause accelerated erosion.

Water produced in association with natural gas or oil production could also be used to hydrostatically test new pipeline. Produced water used for testing will subsequently be disposed of in a manner approved by the BLM in the Plan of Development (POD) or ROW application.

Subsoil will be backfilled and compacted into the trench over the pipe. Site regrading will occur where necessary. Reclamation of the pipeline route would occur as authorized by the BLM ROW Grant.

There are several natural gas pipeline transmission systems currently in operation within the project area. The Operators plan to use the existing network of gas-gathering pipelines for transport of natural gas. New gathering pipelines will become part of the gas-gathering system currently managed by KN Energy, Inc. (Pony Express Pipeline) and Colorado Interstate Gas Company (CIG) [DEIS] (Figure 1-2).

New gas gathering pipelines will range in size from 2 to 6 inches in diameter. Distance from a new well to the existing gathering system will range from 0.5 to 2.5 miles. The maximum width of the disturbance area will be 40 feet, including both lines installed in the access roads and those which cross country.

Pipelines would be placed adjacent to existing pipelines or roads where possible. A typical schematic of pipeline installation procedures along side roads is shown in [DEIS] Figure 2-2.

3.0 COMPLETION AND TESTING OPERATIONS

All access roads to productive well sites will be maintained for well servicing activities (i.e., maintenance, improvements, etc.) if drilling is productive. Reclamation will be completed on segments of the well pad and access road ROW no longer needed.

Well completion operations involve the placement and cementing of well casing and perforation, stimulation and testing of potentially productive zones. Well casing involves running steel casing pipe into the open borehole and cementing the pipe in place. Perforation, stimulation, and testing requires large equipment to be transported and utilized at the well site, and flaring of produced gas. A typical cased well bore would consist of conductor pipe, surface casing, and production casing.

Surface casing would be set at the start of drilling operations to prevent gas, oil, condensate, or water from migrating from formation to formation and to isolate producing zones. Setting and cementing of production casing provides separation and isolation from abnormally pressured zones, usable water zones, and other mineral deposits. The well casing would be perforated in the productive interval to allow the flow of hydrocarbons to the surface. Approximately 10,000 barrels of water may be needed in the completing and testing operations per well. Most completions use a string of tubing that is inserted in the casing to the top of the perforated productive zone to isolate the flow of gas, condensate, and water to flow to the surface where it is collected, measured, and contained. Completion operations typically last 3 to 4 weeks for each shallow well, and 60 days for deep tests. [DEIS] Figure 2-7 shows a typical well pad layout during production/testing operations.

4.0 PRODUCTION OPERATIONS

Production operations would occur on a year-round basis, occasionally limited by weather, maintenance, workover operations, and ground and site conditions. Production operations will require use and maintenance of access roads within the project area on a year-round basis. It may become necessary in the future to install powerlines to well sites along existing roads. Two instances where powerlines may be constructed would include the need to install cathodic protection and to run emission control units.

Typical gravel road maintenance will occur during the summer and early fall months. Winter maintenance will include blading of snow from the access road as necessary, with the blade kept above the ground surface.

Each individual natural gas production site for a single-well would be approximately 1.5 acres (300 feet by 220 feet) as shown in [DEIS] Figure 2-8. A typical production facility layout for a twin well is shown in [DEIS] Figure 2-9. Production sites for deep horizon tests would occupy approximately 3.1 acres (300 feet by 450 feet). A typical completed (cased) well bore diagram for a vertical well within the project area is shown in [DEIS] Figure 2-10 for a Bullfrog Unit well, and [DEIS] Figure 2-11 for a Cave Gulch Unit well.

Cut and fill slopes associated with each production well site will be reclaimed as prescribed in the APD/ROW. Each producing well would be serviced by its own production facility, unless consolidation of production facilities for closely spaced wells is technically and economically feasible. All wells would be manually operated, requiring daily site visits by a service vehicle. Casing prevents drill hole cave-in and aquifer mixing, confines production to the well bore, and provides a means of controlling pressure to facilitate installation of surface and subsurface well equipment.

A typical cased well bore consists of conductor pipe, surface casing, and production casing. Surface casing is set deep enough and cemented to the surface to protect freshwater aquifers.

Surface casing is set at the start of drilling operations. Setting production casing and cementing it in place is designed to prevent gas, oil, condensate, or water from migrating from formation to formation and to isolate producing zones. Most completions in the project area use a string of tubing that is inserted in the casing to the top of the perforated productive zone to allow gas, condensate, and water to flow to the surface where it is collected, measured, and contained.

5.0 ANCILLARY FACILITIES

The Operators and pipeline companies would construct ancillary facilities as necessary to meet production needs. Such facilities would include, but not be limited to: (1) produced water disposal equipment, (2) individual well site compression, (3) individual well site liquids (hydrocarbon liquids) recovery units, (4) electrical power lines, (5) gas metering stations, (6) pipeline pigging facilities, (7) field storage buildings, and (8) cathodic protection facilities. The number and exact location of such ancillary facilities is not known at this time, but most would be installed within the boundaries of existing disturbances. For those facilities which would not be in existing disturbed areas, the Operators estimate that approximately 25 acres of new disturbance would occur.

A liquids recovery plant is tentatively proposed in Section 1, Township 36 North, Range 87 West, on BLM administered surface and adjacent to the paved county road. A ROW from the BLM will be needed for the plant site. Powerlines to service the site are in-place. The surface area required for the plant site is estimated to be 10 acres. Pipeline access to the plant site will cross the county road from the Arminto Meter Station. The 10-inch gathering line installed by Barrett Resources Corporation during 1996 would serve the inlet to the plant site. No new outlet lines are planned.

Components of the plant include an inlet separator, molecular sieve dehydrator, cryogenic process skid, residue gas compressors, process heater, generators, and natural gas liquid storage tanks. A Section 21 permit from the Wyoming Department of Environmental Quality (WDEQ) will be required for plant construction and operation. The plant will operate continuously and be manned during daylight hours.

6.0 GEOPHYSICAL OPERATIONS

No additional geophysical operations are currently planned by the Operators in the CGBW project area, but are possible in the future.

7.0 SITE RESTORATION AND ABANDONMENT

The Operators propose to completely reclaim all disturbed areas not needed for production activities including: (1) pipeline ROW; (2) portion of road ROW not needed in the function of the road; and (3) the portion of the drill pad not needed during production. Reclamation will generally include: (1) complete cleanup of the disturbed areas (drill sites, access roads, etc.); (2) restoration of the disturbed areas to the approximate ground contour that existed prior to construction; (3) ripping of disturbed areas to a depth of 12 to 18 inches; (4) replacement of topsoil over all disturbed areas; (5) seeding of reclaimed areas with the seed mixture prescribed in [the Reclamation Guidelines, ROD Appendix A, Section III]; and, (6) fertilizing, if considered necessary by the BLM AO.

Specific reclamation recommendations for use with the natural gas drilling and production operations within the project area are described in [the Reclamation Guidelines, ROD Appendix A, Section III]. The final set of reclamation measures to be applied will be developed in the APD or ROW grant by each operator in consultation with the BLM and will be specific to each site and the conditions at that site.

8.0 PROJECT-WIDE MITIGATION MEASURES

The following mitigation measures and procedures on public lands will be implemented to avoid or mitigate resource or other land use impacts. These mitigation measures and design features may be waived on a case-by-case basis when deemed appropriate by the BLM. This determination would be made only after a thorough, site-specific analysis determines that the resource or land use for which the measure was put in place would not be significantly impacted.

8.1 Geology/Minerals/Paleontology

Paleontological resource values will be protected through the following mitigation measures:

- Information on known and potential fossil resources and proper procedures for treatment of discovered fossils within the project area will be conveyed to construction personnel.

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- Contingency will be made in the event that significant fossils are discovered in areas not monitored during construction. Construction activities which could adversely affect fossils will be redirected until a qualified paleontologist has been consulted and has made and implemented recommendations regarding further mitigation, if any are warranted.

- A paleontologic field survey has been completed on the Cave Gulch area. A paleontologic resources report documenting the survey is provided in the DEIS, Appendix E . The report describes the survey methods, results of survey, and follow-up recommendations. These measures are summarized as follows:

    - In areas determined to have high paleontologic potential as shown in the DEIS, Figure 3-1, where surface disturbance is unavoidable, a representative sample of fossil remains will be collected from the surface and from anthills prior to construction disturbance. Anthill material will be screened, bagged, and sorted under a binocular microscope by a qualified paleontologist to retrieve microfossil vertebrate remains.

    - Fossils collected as a result of preconstruction sampling or during treatment of an unanticipated discovery will be curated into the collections of the University of Wyoming. Curation will include identifying the remains and cataloging them into the vertebrate paleontology collections of the Department of Geology and Geophysics at the University of Wyoming, Laramie, WY.

    - A letter report describing the results of paleontologic mitigation efforts and documenting the curation of specimens into the University of Wyoming collections will be prepared. The scientific significance of recovered fossils will be discussed in the report. Copies of the report will be provided to the BLM and project proponents.

8.2 Air Quality

- Garbage and refuse will not be burned at the drill sites or other facilities.

- The Operators will initiate immediate abatement of fugitive dust (by application of water, chemical dust suppressants, or other measures) when an air quality, soil loss, or safety concerns are identified by the BLM or the WDEQ/Air Quality Division (AQD). These concerns include, but are not limited to, potential exceedance of applicable air quality standards. The BLM will approve the control measure, location, and application rates. If watering is the approved control measure, the operator must obtain the water from State-approved source(s).

- The air quality impact assessment assumed water and/or chemical dust suppressants would be applied in order to achieve a 50 percent control efficiency (at an assumed application rate of 0.02 gallons per square yard) in order to minimize total suspended particulate matter (TSP) and PM10 (particulate matter - up to 10 microns) in effective diameter fugitive dust emissions.

- Roads constructed on soils susceptible to wind erosion will be graveled, or dust inhibitors periodically used on unpaved local, collector or arterial roads which present a fugitive dust problem. Operators could also establish and enforce speed limits for all non-surface roads.

- [The maintenance and improvement of air quality is the responsibility of the State of Wyoming air regulatory agency (WDEQ/AQD) with Environmental Protection Agency (EPA) oversight. The Operators of future natural gas facilities must obtain pollution emission permits prior to operation, and continue to demonstrate compliance with air quality permit requirements once operations begin. Since the BLM cannot conduct or approve any activity which does not comply with all applicable air quality laws, statutes, regulations, standards or implementation plans, existing BLM authorizations are subject to revocation if State or Federal air quality requirements are violated. (See FEIS section 5, response to comment 42-1, page 5-19.)]

8.3 Soils

- Reduce the area of disturbance to the absolute minimum necessary for construction and production operations while providing for the safety of personnel. The Operators will restrict off-road vehicle activity.

- Where feasible, buried pipelines will be located immediately adjacent to roads to avoid creating separate areas of disturbance and in order to reduce the total area of disturbance.

- Design cut and fill slopes in a manner that will allow retention of topsoil, surface treatment such as mulch, and subsequent revegetation. Where possible, minimize disturbance to vegetated cuts and fills on existing roads that are improved.

- Salvage and selectively handle the upper 6 to 12 inches of the soil and use the salvage topsoil in revegetating soil disturbances. Every effort should be taken to minimize mixing of subsoil with topsoil as well as mixing course fragments with finer-textured topsoil.

- Install culverts for ephemeral and intermittent drainage crossings. Design all drainage crossing structures to carry the 25- to 50-year discharge event, or as otherwise directed by the BLM.

- Implement minor routing variations during access road layout to avoid steep slopes adjacent to ephemeral or intermittent drainage channels. Maintain a 100-foot wide buffer strip of natural vegetation where possible (not including wetland vegetation) between all construction activities and ephemeral and intermittent drainage channels.

- During the site-specific planning process, avoid to the maximum extent possible sensitive soil areas, areas with poor and very poor reclamation potential, and slopes in excess of 15 percent. There is a good chance the avoidance of these areas would be feasible in most cases based on site-specific field review during the APD process. Where these areas cannot be avoided, special construction techniques and mitigation measures will need to be developed and approved by the BLM AO before authorization and construction of project facilities in such areas could occur. The specific construction measures developed for project facilities that absolutely cannot avoid such areas would have to be based on site-specific field analysis during the APD process.

- With the exception of active work areas, all disturbed highly erosive or sensitive areas to be left bare, unprotected, or unreclaimed for more than one month will have a protective cover of suitable material in the form of mulch, matting, or vegetative growth. All other disturbed areas should have an effective protective cover within six months.

- Disturbed areas should be stabilized with appropriate treatments (topsoiled, mulched, erosion control, etc.) immediately following project facility construction until the areas can be seeded with site-specific mix(es) during the next appropriate planting period (spring or fall).

- Per BLM Wyoming State Reclamation policy (USDI-BLM 1990) and Executive Order 11987 [Exotic Organisms], site specific seed mixes should be developed that primarily include native species. Introduced species should be avoided where practicable. Such seed mixes should include a variety of grasses, forbs (including nitrogen-fixers), and shrubs where appropriate. Section III of this ROD Appendix A, Reclamation Guidelines, presents guidelines for reseeding project disturbances.

- Limit construction activities to periods when soil materials are dry and not frozen or wet.

- Include in road design adequate drainage control devices and measures (e.g., road berms and drainage ditches, diversion ditches, cross drains, culverts, out-sloping, and energy dissipators) at sufficient intervals and intensities to adequately control and direct surface runoff above, below, and within the road environment to avoid erosive concentrated flows. In conjunction with surface runoff or drainage control measures, use erosion control devices and measures such as temporary barriers, ditch blocks, water bars erosion stops, mats, mulches, and vegetative covers. Implement a timely revegetation program as soon as possible to re-establish the soil protection afforded by a vegetal cover. Section III, Reclamation Guidelines presents techniques for stabilizing and reseeding project disturbances.

- Upon completion of construction activities, restore topography to near pre-existing contours at the well sites, along access roads and pipelines, and other facilities sites; replace up to 12 inches of topsoil or suitable plant growth material over all disturbed surfaces; apply fertilizer as required; seed (specified in a reclamation plan); and mulch as required.

8.4 Water Resources

- Limit construction of drainage crossings to no-flow periods or low-flow periods.

- Minimize the area of disturbance within perennial, ephemeral and intermittent drainage channel environments.

- Design channel crossings to minimize changes in channel geometry and subsequent changes in flow hydraulics.

- Maintain vegetation barriers occurring between construction activities and ephemeral and intermittent channels.

- Design and construct effective surface runoff, erosion, and sediment control measures at all sites of disturbances. Such measures include but are not limited to interception ditches, sediment traps/silt fences, water bars, silt fences and revegetation and soil stabilization measures.

- Case wells during drilling, and case and cement all wells in accordance with Onshore Order No. 2 to protect accessible high quality water aquifers. High quality water aquifers are aquifers with known water quality of 10,000 ppm TDS or less. Include well casing and welding of sufficient integrity to contain all fluids under high pressure during drilling and well completion. Further, wells will adhere to the appropriate BLM cementing policy.

- Reserve pits will be constructed so that a minimum of one-half of the total depth is below the original ground surface on the lowest point within the pit. There is sufficient information on the character of soils and the sensitivity of the hydrologic environment to require that all pits be lined, in accordance with the WOGCC standards.

- Extract hydrostatic test water used in conjunction with pipeline testing and all water used during construction activities from sources with sufficient quantities and through appropriation permits approved by the State of Wyoming.

- Coordinate all crossings or encroachments of waters of the U.S. with the U.S. Army Corps of Engineers (COE). The Operators must coordinate with the COE to determine the specific Clean Water Act Section 404 permit requirements and conditions (including the potential requirement of compensatory mitigation) for each facility that occurs in waters of the U.S. to prevent the occurrence of significant impact to such waters.

- Develop and implement a pollution prevention plan (PPP) for storm water runoff at drill sites as required per WDEQ storm water NPDES permit requirements. The NPDES permit will require Operators to develop surface runoff, erosion, and sedimentation control plans; oil spill containment and contingency plan; as well as other environmental protection plans to ensure that the opportunity or probability of water pollution is minimized. The WDEQ requires Operators to obtain a field permit for fields of 20 wells or more.

- Exercise stringent precautions against pipeline breaks and other potential accidental discharges of toxic chemicals into adjacent streams. If liquid petroleum products storage capacity exceeds criteria contained in 40 CFR Part 112, a Spill Prevention Control and Countermeasures (SPCC) plan will be developed and complied with in accordance with 40 CFR Part 112, dated December 1973.

- Well sites, access roads, and pipelines should not be constructed within 200 feet of ephemeral and intermittent drainage channels; within 500 feet of live streams, lakes, reservoirs, canals, and associated riparian habitat, and water wells; and within 660 feet of springs or artesian and flowing wells. Exceptions to this should be approved by the BLM based on an environmental review and site specific mitigation plans.

- The project must comply with Executive Orders 11988 (floodplain protection) and EO 11990 (wetlands protection), and RMP management directives that relate to protection of water resources identified in Section 4.4.2 of the DEIS. These regulations require avoidance of stream channels to the maximum practicable extent. Where total avoidance is not practicable, then minimization of impacts to streams and associated floodplains/floodways must be implemented. Where waters and floodplains cannot be avoided, the Operators will be required to show BLM AO why such resources cannot be totally avoided and how impacts would be minimized during the APD process.

- Construct channel crossings by pipelines such that the pipe is buried well below the maximum scour depth or a minimum of four feet below the channel bottom.

- Regrade disturbed channel beds to the original geometric configuration and replace bed material with the same or very similar channel bed material.

- Ensure reserve, produced water, and evaporation pits are not in danger of overflowing; the maximum containment level should not exceed two feet of freeboard. Shut down operations until the problem is corrected if leakage is found outside the pit.

- Discharge all concentrated water from surface runoff within access road ROWs and hydrostatic test waters in a manner as not to result in increased or accelerated erosion. In certain applications, energy dissipators (e.g., riprapped aprons and discharge points) should be utilized. All discharged water should be directed into undisturbed vegetation. Use and discharge of hydrostatic test water must comply with the right of way stipulation on hydrostatic testing.

8.5 Vegetation and Wetlands

- [Effective reclamation of project disturbances shall be accomplished following the measures identified in Appendix A, Section III (Reclamation Guidelines) of this ROD, and the Soils, Water, and Vegetation Resources Technical Report (ECOTONE 1997). The suggested reclamation techniques presented in Appendix A, Section III of this ROD are designed to keep the project in compliance with Executive Order 11987, Exotic Organisms (see DEIS section 4.5.5, page 4-48).]

- If a plant species of concern is known to be present at the location of a proposed action, impacts will be minimized by avoiding these plant habitats where possible. Adjustments to the location of project facilities will be made to avoid or minimize impacts to plant species of concern habitats.

- Shifts in the proposed location of facility sites as addressed in the EIS should be evaluated relative to the occurrence and distribution of waters of the U.S. If such sensitive areas are found, the facility should be relocated to avoid impacts. Where avoidance is not practicable, impacts should be minimized through modification and minor relocations. Activities that involve dredge, fill, or excavation of wetlands must be coordinated with the COE.

8.6 Range Resources and Other Land Uses

- Coordinate with the affected livestock operators to ensure that livestock control structures constructed in conjunction with the Proposed Action remain functional during drilling and production operations.

8.7 Wildlife

- During reclamation, establish a variety of forage species that are useful to resident herbivores by specifying the seed mixes in the approved APD/ROW.

Big Game, Upland Game Birds, Special Status and General Wildlife

- To facilitate big game movements and minimize the potential for injuries, do not fence access road ROWs.
- To avoid injury and mortality to migratory birds, hydrocarbons floating on the surface of the reserve pits will be removed as soon as possible after drilling operations are completed. If any oil is on the pits and is not removed immediately after drilling operations cease, the pits will be netted or otherwise secured. Similarly, open tanks containing oil or other adverse substances will be netted or otherwise secured to protect migratory birds. Fencing of both reserve pits and produced water pits will be done, either around the pit itself or the entire location, to prevent access by cattle and wildlife.
- Following construction, reclaim access road and pipelines, unused portions of well pads, and wells that are not productive and incorporate forage and shrub species into the reclamation seed mix that include staple forage and browse plants for pronghorn and mule deer.
- In order to reduce incidents of illegal kill and harassment of wildlife, all project workers should be instructed on local wildlife regulation and State wildlife laws and regulations should be posted in conspicuous places at the job sites. Personnel should also be instructed about the nature of the wildlife species that occur on the work site, potential impacts to these species, and measures that could be taken to avoid or minimize impacts.
- If a swift fox is known to be present at the location of a proposed action, coordination with FWS will be conducted to mitigate impacts.
- If an action which includes surface disturbance during March 15 through August 15 is proposed within potential mountain plover habitat (Figure A-1), surveys for the presence of nesting mountain plovers will be required in accordance with the FWS guidelines.

Raptors

- The Operators, in consultation and cooperation with the BLM and FWS, will implement the Raptor Management and Monitoring Plan (see Appendix B of this ROD).

8.8 Recreation

- Minimize conflicts between project vehicles and equipment and recreation traffic by posting appropriate warning signs, implementing operator safety training, and requiring project vehicles to adhere to low speed limits.

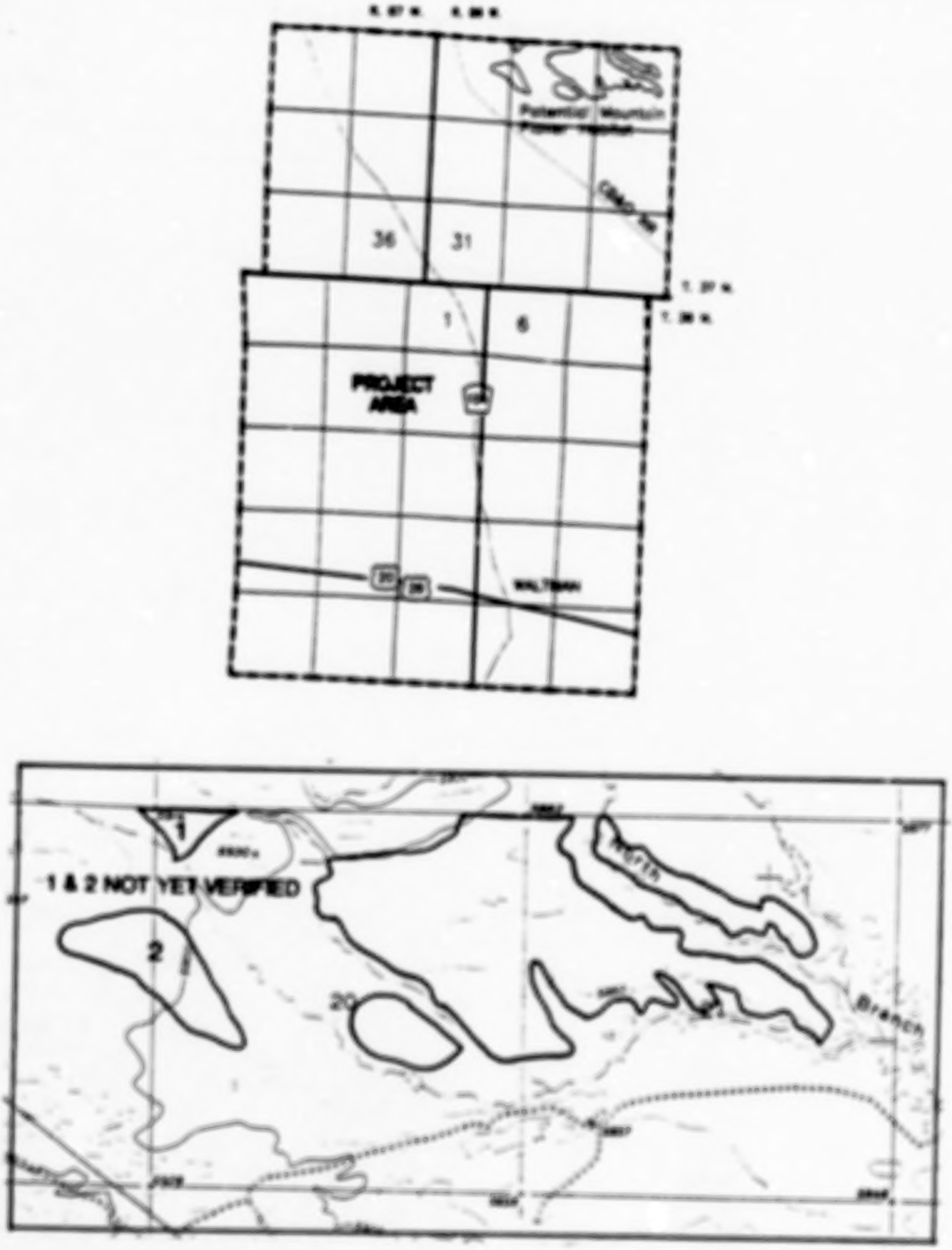

Figure A-1 Potential Mountain Plover Habitat

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- [Reconstruct (redesign) the existing interpretive site in the project area to explain the geologic, cultural, and paleontological features of the project site. The redesigned exhibit would emphasize the oil and gas resources and the importance of developing these resources on federal land in Wyoming and the United States (DEIS, section 4.8.5, page 4-74).]

- [Construct a new South Bighorn/Redwall Backcountry Byway interpretive exhibit outside the project area in a more scenic location to be determined by BLM recreation specialists and landscape architects (DEIS, section 4.8.5, page 4-74).]

8.9 Visual Resources

- Utilize existing topography to screen roads, pipeline corridors, drill rigs, well heads, and production facilities from view.

- Paint well and central facilities site structures with Carlsbad Canyon, except for structures that require safety coloration in accordance with Occupational Safety and Health Administration (OSHA) requirements.

- [Eradicate noxious weeds from roadcuts, pipeline corridors and other surface disturbances. No future authorization will be given to include sweet clover in seed mixtures, but existing sweet clover will not be removed where successful erosion control and revegetation currently exist (DEIS section 4.9.5, page 4-79, and FEIS section 5, response to comment 45-29, page 5-46).]

8.10 Cultural Resources

- If a site is considered eligible for nomination to, or is on the National Register, and if that site will be impacted, then mitigative procedures must be implemented. Avoidance is the preferred method for the mitigation of adverse effects to an eligible property. Avoidance is accomplished through project redesign to totally eliminate or minimize Impacts. The total avoidance of significant cultural resources is not always possible or prudent given other management considerations. The total avoidance of some properties, (e.g., historic trails), may be considered not to be the preferred option if the avoidance would lead to greater overall land disturbance or would result in significant impacts to other resources such as wildlife, hydrology, soil, or range. Mitigation of adverse effects to properties that can not be avoided would be accomplished by the documentation of the physical remains. For historic sites consisting of standing structures this could include detailed drawings and photographs following regulatory standards. For archaeological properties the documentation of physical remains would consist of data recovery.

- Mitigation of adverse effects to cultural/historical properties that cannot be avoided will be accomplished by the preparation of a cultural resources mitigation plan.

- Provide cultural awareness training of the operators' personnel and contractors to avoid vandalism or cultural site damage.

- If cultural resources are discovered at any time during construction, all construction activities will halt and BLM personnel will be immediately notified. Work will not resume until a Notice to Proceed is issued by the BLM.

8.11 Socioeconomics

- Coordinate project activities with ranching operations to minimize conflicts involving livestock movement or other ranch operations. This will include scheduling of project activities to minimize potential disturbance of large-scale livestock movements. Establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling.

- The Operators could implement hiring policies that will encourage the use of local or regional workers who will not have to relocate to the area.

- Natrona County [could] encourage all contractors working in the project to obtain a Natrona County sales and use tax license to maximize revenues for Natrona County and its municipalities. These revenues could be used to offset any increased demand for local government facilities and services.

- Natrona County [could] encourage contractors to hire qualified local workers for any Proposed Action-related jobs. This would help reduce Natrona County under- and unemployment and ensure that population in-migration and the associated demand for local government facilities and services would be minimal.

8.12 Transportation

- Existing roads should be used as collectors and local roads whenever possible to minimize the amount of surface disturbance within the area. Standards for road design should be consistent with BLM Road Standards Manual Section 9113.

- Permits are required from Natrona County for road access to or across a county road or for any pipeline crossing of a county road. These permits should be acquired prior to construction of additional roads.

- All wellfield development roads on public lands which are not required for operation and maintenance of field production should be permanently blocked, re-contoured and reseeded. Roads on private lands should be treated similarly depending on the desires of the land owner.

- The Operators will coordinate with the Wyoming Department of Transportation regarding the installation of signs to alert motorists of the increase in truck traffic entering US 20/26 during peak periods of development each year

- The Operators will be responsible for preventive and corrective maintenance of roads in the project area throughout the duration of the project. This may include blading, cleaning ditches and drainage facilities, dust abatement, noxious weed control, or other requirements as directed by the BLM or the Natrona County Road, Bridge and Parks Department.

8.13 Health and Safety

- Sanitation facilities installed on the drill sites and any resident camp site locations will be approved by the WDEQ.

- To minimize undue exposure to hazardous situations, require measures that will preclude the public from entering hazardous areas and place warning signs alerting the public of truck traffic.

- The Operators will haul all garbage and rubbish from the drill site to a State-approved sanitary landfill for disposal. The Operators will collect and store any garbage or refuse materials on location prior to transport in closed containers.

- During construction and upon commencement of production operations, the Operators will have a chemical or hazardous substance inventory for all such items that may be at the site. The Operators will institute a Hazard Communication Program for its employees and will require subcontractor programs in accordance with OSHA 29 CFR 1910.1200. These programs are designed to educate and protect the employees and subcontractors with respect to any chemicals or hazardous substances that may be present in the work place. It will be required that as every chemical or hazardous material is brought on location, a Material Safety Data Sheet (MSDS) will accompany that material and will become part of the file kept at the field office as required by 29 CFR 1910.1200. All employees will receive the proper training in storage, handling, and disposal of hazardous substances.

- Spill Prevention Control and Countermeasure (SPCC) Plans will be written and implemented as necessary in accordance with 40 CFR Part 112 to prevent discharge into navigable waters of the United States.

- Chemical and hazardous materials will be inventoried and reported in accordance with the Superfund Amendments and Reauthorization Act (SARA) Title III. 40 CFR Part 335, if quantities exceeding 10,000 pounds or the threshold planning quantity (TPQ) are to be produced or stored in association with the Proposed Action. The appropriate Section 311 and 312 forms will be submitted at the required times to the State and County Emergency Management Coordinators and the local fire departments.

- Any hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), will be transported and/or disposed of in accordance with all applicable Federal, State, and local regulations.

- The Operators plan to design operations to severely limit or eliminate the need for Extremely Hazardous substances. The Operators also plan to avoid the creation of hazardous wastes as defined by RCRA wherever possible.

- Appendix D (Hazardous Substance Management Plan) of the DEIS provides a summary of the hazardous chemicals that may be on a drilling or production site with examples of representative chemicals and associated physical and health hazards. At this time it is impossible to determine if these items would be stored in sufficient quantities to require reporting under SARA Title II, and in some cases, the items may not be on site at all.

However, all items would become part of the Hazard Communications Plan where required, and employee training would be completed as required.

- Signs could be posted informing the public that they are entering an area of intensive natural gas development to discourage hunting and recreation use in the area, and to reduce a potential source of firearms accidents. Fire suppression equipment, a no smoking policy, shutdown devices or other safety measures typically incorporated into gas drilling and production activities could be used to minimize the risk of fire.

8.14 Noise

- Mufflers will be installed on drill rig engines, and on all internal combustion engines installed at compressor sites, tank batteries and the liquids recovery plant.
- All medium and heavy weight vehicles (i.e., 10,000 pound gross vehicle weight or more) and construction equipment manufactured after 1978 will have properly installed mufflers that meet Federal noise control standards.
- Wherever feasible, and if available, diesel-electric drill rigs will be used if activities will occur 0.5 miles or less from a noise sensitive location (e.g., near an occupied nest or a residence).
- Before a drilling location, compressor or liquids recovery plant is placed 0.5 miles or less from a noise sensitive location (e.g., an occupied raptor nest or residence), a description of equipment-specific and location-specific noise mitigation measures will be incorporated into the applicable permit application to BLM.
- Before a central compression facility with multiple engines is constructed, a description of equipment-specific and location-specific noise mitigation measures should be incorporated into the applicable permit application to BLM. A central compressor facility should incorporate sound control measures such as mufflers and a building around compressor engines.

9.0 MONITORING

The BLM and CGBW Operators will coordinate to perform environmental compliance to assure that, during the life of the project, mitigation measures are applied and monitoring activities are conducted as necessary to assure impacts are minimized.

9.1 Paleontological Resources

In addition to the predisturbance survey conducted as deemed appropriate by the BLM, specific, unavoidable high-value sites will be monitored as necessary by a qualified paleontologist monitor during construction. If significant paleontological materials are found during construction, all activities at the site will cease immediately and the AO will be notified immediately by the Operators or their subcontractor to assure proper handling of the discovery by a qualified paleontologist.

9.2 Soils

The Operators and/or BLM will conduct regularly scheduled monitoring of erosion control structures within the CGBW project area to ensure maintenance of the operating integrity of these structures. Monitoring procedures and schedules will be specified through implementation of measures contained in the Reclamation Guidelines section of this ROD. Appropriate remedial action will be taken by the Operators to correct nonfunctioning structures .

[The BLM will monitor field development activities in the Cave Gulch watershed on an annual basis through implementation of the Reclamation Guidelines section of this ROD for oil and gas projects which may be developed in the watershed. Should the level of disturbance in the Cave Gulch watershed become important, the BLM will coordinate with private land owners, State and local agencies, and other Federal agencies to determine if a watershed management plan should be prepared.]

[Based on the data collected and presented in the EIS, and the impact analysis findings, it is not necessary to prepare a watershed management plan at this time. The key aspects of a watershed management plan are addressed through the Soils, Water Resources, and Vegetation and Wetlands sections of Chapters 3, 4, and 5 of the Draft EIS. The main concerns that would be addressed in a watershed management plan are erosion and sedimentation, and the most likely increases of erosion and sedimentation from current levels would be a direct result of oil and gas development. The Cave Gulch watershed in the north end of the project area is where the lowest level of proposed field development would occur. In addition, the majority of the surface in this watershed is under private ownership. (See DEIS sections 4.3.5 and 4.4.5, pages 4-30 and 4-40, respectively.)]

9.3 Water Resources

The Operators will specify in Erosion, Revegetation and Reclamation Plans (ERRPs) developed through implementation of the Reclamation Guidelines section of this ROD, and/or in Wyoming DEQ-Water Quality Division Stormwater Pollution Prevention Plans (SPPP), their plans for conducting compliance evaluations at regularly scheduled intervals, but in no case less than once a year. This will include visual monitoring reconnaissance of surface waters to detect changes in water quality resulting from sedimentation. Periodic water samples will be collected, analyzed, and evaluated to ensure that produced water and water disposal methods, as well as any on-site discharge, are in compliance with Federal and State water quality standards. In addition, if waters are discharged to the surface, the quantity of the water discharged will be monitored to ensure that releases do not exceed the abilities of existing drainage systems to convey discharge flows. Appropriate remedial actions will be immediately taken to correct any out-of-compliance conditions.

9.4 Vegetation

The Operators and the BLM, will coordinate monitoring of revegetation success using criteria outlined in the Reclamation Guidelines section of this ROD. Standard success criteria will be attainment of 50% of predisturbance cover in three years and 80% of predisturbance cover in five years. The performance standards will be reached when a site reaches 80% of predisturbance cover. The reclamation monitoring program shall include written documentation regarding the effectiveness and success of reclamation mitigation.

Weed monitoring should occur for species identified by the State of Wyoming as well as for additional species specified by Natrona County during a given year. Such species comprise the official list of weeds for which a county may cost-share funding for control and removal efforts. Should such species be found during monitoring, control and eradication efforts should be implemented following County control procedures. Further, construction contractors will be required to clean vehicles and equipment of weed seed prior to traveling into the project area [if the AO determines this is necessary to prevent weed introduction by vehicles coming from areas located long distances away from the project area (see DEIS section 4.5.5, page 4-49, and FEIS section 5, page 5-46, response to comment 45-29).]

9.5 Range Resources and Other Land Uses

Monitoring of surface pipelines for formation of livestock trails parallel to the pipelines will be performed by the Operators and grazing lessees.

9.6 Wildlife and Fisheries

The Operators, in consultation and cooperation with the BLM and FWS, will implement the Raptor Management and Monitoring Plan (Appendix B of this ROD).

Any big game, raptor, game bird, candidate, or sensitive species mortalities in the project area noted by the Operators will be reported to the BLM, [Platte River Resource Area, Mills, Wyoming at (307) 261-7500] and/or WGFD [Casper, Wyoming at (307) 473-3400 or 234-5940], as soon as practical.

9.7 Cultural and Historic Resources

In addition to Class III inventories, construction activities may be occasionally field checked by a qualified BLM-permitted archeologist. If historic or prehistoric materials are discovered during construction, all activities at the site will cease immediately and appropriate BLM personnel will be notified by the Operator or their subcontractors to assure proper handling of the discovery by a qualified archeologist.

9.8 Land Use

Road signs (e.g., directional, speed limit) in the project area will be maintained and monitored by the Operators. The Operators will conduct all maintenance and monitoring operations to ensure that signs are in proper repair and placed in appropriate locations. Construction monitoring by the BLM may be conducted where proposed pipelines cross existing underground pipeline or cable ROWs.

9.9 Hazardous and Solid Waste

Hazardous materials used, produced, transported, stored, and disposed of as a component of this project will be in accordance with all Federal and State rules and regulations.

Any hazardous material spills will be handled as specified in SPCC Plans. The Operators will be responsible for reporting spills of hazardous materials and implementing applicable procedures, monitoring, and reporting requirements.

SECTION III

RECLAMATION GUIDELINES

1.0 INTRODUCTION

The following erosion control, revegetation, and management guidelines are designed to attain successful reclamation of disturbed areas associated with the Cave Gulch-Bullfrog-Waltman Natural Gas Field Development Project. These recommended measures are designed to establish the feasibility of successfully reclaiming disturbances associated with this project. These guidelines were developed based on: (1) Bureau of Land Management (BLM) Wyoming State Office reclamation policy (USDI-BLM 1990), (2) management directives presented in the Platte River Resource Area Resource Management Plan (RMP) (USDI-BLM 1984), (3) Executive Order 11987, (4) impacts identified in the Environmental Consequences chapter (Chapter 4) of the environmental impact statement (EIS), and (5) through issues identified during the scoping process. In addition to Chapter 4 of the EIS, environmental characterization and details that relate to reclamation feasibility are presented in the Soils, Water, and Vegetation Resources Technical Report (ECOTONE 1997).

The extent of possible disturbed areas to be reclaimed include the drill sites, access roads and pipelines, facilities sites, and staging areas. The following guidelines apply to the Proposed Action, Alternative A, Alternative B, and Alternative C, the "No Action" alternative. The measures presented in this appendix are designed to allow the project to be constructed without significant impacts to natural resources including soils, watershed, vegetation, and wildlife habitat. Because of the large geographic area covered by the project, and the fact that specific project facilities sites cannot be located at this time, these measures are presented in a general, non-project facility specific manner. Final selection of the measures to be applied at any given location, and modifications of these measures, will be identified by the BLM in coordination with the project operators (Operators) during the process of reviewing each Application for Permit to Drill (APD).

This section provides reclamation guidelines only; and therefore, this document is *not* a reclamation plan. The guidelines cannot be required by the BLM on state surface over state or private minerals, or on private surface over private or state minerals. The land manager and/or the land owner of State and private lands will determine the reclamation measures to be applied on those lands. The land manager and/or the land owner should find these guidelines to be appropriate for such lands.

On BLM administered lands, the final reclamation measures that would be applied should be based upon site-specific conditions and validation of these measures upon the approval of, and in agreement with, the BLM Authorized Officer (AO) during the APD review process. These guidelines describe how drilling activities should be managed to assure compliance with the resource management goals and objectives for the general area, applicable lease and unit area stipulations, and resource limitations identified during interdisciplinary (ID) team analysis. *If deemed necessary in light of new facts (e.g., effectiveness of specific measures, cost feasibility, and/or availability of materials and supplies, etc.) or to minimize impacts, the following measures may be applied where and when needed, added to, modified, or selectively withheld by the Operators in agreement and consultation with the BLM AO.* Initial monitoring for compliance and successful implementation of the mitigation measures will be under the direction of the operator. Final approval and release will be under the direction of the BLM AO on public lands.

Reclamation measures covered in this appendix fall into two general categories: temporary and final reclamation. Temporary reclamation refers to measures applied to stabilize disturbed areas and to control runoff and erosion during time periods when application of final reclamation measures is not feasible or practicable. Final reclamation refers to measures that should be applied concurrently with completion of drilling and pipeline installation, and final well site and facility abandonment.

Reclamation potential may be limited by salinity, alkalinity, steep slopes, shallow soils, shallow depth to bedrock, low precipitation, stoniness, non-cohesive soils, high wind and water erosion, periodic flooding, short growing season, seasonably high water tables, and strong winds. Intensive land-use practices may be necessary to mitigate salt and sediment loading caused by surface-disturbing activities. Activity plans (e.g., APDs, [Sundry Notices, and ROWs]) should address site-specific problems, including monitoring for salt and sediment loading.

In general, temporary reclamation measures should be applied to all areas not promptly reclaimed to final conditions within a specified time period whether due to adverse weather conditions, inability to secure needed materials, and/or seasonal constraints, etc. Temporary reclamation measures should be applied only as needed; as in most cases, final reclamation measures should be applied concurrently as sections of the project are completed. Temporary reclamation measures may be applied more rigorously to sensitive areas such as drainage channel crossings, steep slopes, and areas prone to high wind and water erosion. Temporary reclamation measures should include regrading the disturbed area to near predisturbance contour, respreading salvaged topsoil, mulching, and placing runoff and erosion control structures.

Final reclamation measures, in general, involve regrading the disturbed area to near predisturbance contour, respreading salvaged topsoil, applying soil amendments and protective materials (e.g., straw mulch, fertilizers, etc), if necessary, applying a prescribed seed mixture, and placing runoff and erosion control structures such as water bars and silt fences. The duration of the resultant impacts to the various vegetation community types depends in part on the success of implementation of the reclamation measures prescribed in this appendix and the time required for natural succession to return disturbed areas to predisturbance conditions after project completion.

Because wetlands are "waters of the U.S." and are therefore protected under the federal Clean Water Act (CWA), discharge of dredge or fill material into, and/or excavation of wetlands could require administrative coordination with the U.S. Army Corps of Engineers (COE) pursuant to the CWA and may require a Section 404 permit. The COE, based on the exact nature of the disturbance activity should determine the type of permit (Individual, Regional, or Nationwide) required according to the rules and regulations presented in the Federal Register (1986). Avoidance of waters of the U.S. and wetlands should be the highest priority in the planning process. A suitable wetland mitigation plan should be developed in coordination with the COE and the FWS based on these guidelines for the areas of wetlands directly impacted due to project activities where avoidance is not practicable. Impact minimization should include reducing the area of disturbance in wetland areas as well as utilizing procedures specified by authorizing agencies to cross intermittent and ephemeral drainage channels and wetland areas.

Although most intermittent and ephemeral drainage channels are not considered wetlands, the same requirements apply to the discharge of dredge and fill into these surface waters as for discharge into wetlands (see ECOTONE 1997). Residual wetland impacts that could occur after maximum avoidance and/or impact minimization has been demonstrated should be mitigated according to the following order of priority: (1) avoidance; (2) impact minimization; (3) mitigation in-kind, on-site; (4) mitigation in-kind, off-site; (5) mitigation out-of-kind, on-site; and (6) mitigation out-of-kind, off-site. In addition, the following modes of mitigation could be implemented for wetland mitigation if avoidance and impact minimization were not feasible: (1) wetlands restoration; (2) wetlands creation; and (3) wetlands enhancement. The wetlands mitigation plan should be designed to replace the area of impact and functional values associated with the disturbed area.

2.0 OBJECTIVES

This section is designed to meet the following objectives for reclamation of access road/pipeline ROWs and drill sites:

Short-Term (Temporary) Reclamation:

- Immediately stabilize the disturbed areas by mulching (if needed), providing runoff and erosion control, and through the initiation of new vegetation (required for problem areas; may be optional for other areas depending on consultation with the BLM).
- Control and minimize surface runoff, erosion, and sedimentation through the use of diversion and water treatment structures.
- Facilitate the re-establishment of desired native plant communities.

Long-Term (Final) Reclamation:

- Immediately stabilize the disturbed soil surface by mulching (if needed and as directed by the BLM), runoff and erosion control, and through the initiation of protective vegetation. Adequate surface roughness should exist to reduce runoff and to capture rainfall and snow melt.
- Control and minimize surface runoff, erosion, and sedimentation through the use of diversion and water treatment structures.
- Restore primary productivity of the site and establish vegetation that will provide for natural plant and community succession.
- Re-establish desired native plant communities.
- Establish a vigorous stand of desirable native plant species that will limit or preclude invasion of undesirable species, including noxious weeds.
- Revegetate the disturbed areas with plant species useful to wildlife and livestock.

- Enhance aesthetic values of disturbed areas to blend with surrounding undisturbed areas. In the long-term, reclaimed landscapes should have characteristics that approximate the visual quality of adjacent areas, including location, scale, shape, color, and orientation of major landscape features.

3.0 PERFORMANCE STANDARDS

The following performance standards should be used to determine the attainment of successful revegetation. Performance monitoring should follow the guidelines presented in the attachment to this appendix.

All Years:

- Protective cover - with the exception of active work areas, all disturbed highly erosive or sensitive areas to be left bare, unprotected, or unreclaimed for more than one month will have a protective cover of suitable material in the form of mulch, matting, or vegetative growth. All other disturbed areas should have an effective protective cover within six months.

Third Year (Final Reclamation):

- Seeding density - the density and abundance of desirable species is at least three to four seedlings per linear foot of drill row (if drilled) or transect (if broadcast) for most areas. In some sparsely vegetated areas such as badlands and sodic and saline/alkaline bottomlands, this standard can be reduced to one to two seedlings per foot to be commensurate with the naturally low vegetal cover, unless significant surface erosion is anticipated. Vegetative transects will be established on a permanent basis so that transects can be measured annually through the five year monitoring period.

- Percent cover - total vegetal cover will be at least 50 percent of predisturbance vegetal cover as measured along the reference transect for establishing baseline conditions.

By the Fifth Year (Final Reclamation):

- Percent cover - total vegetal cover will be at least 80 percent of predisturbance vegetal cover as measured along the reference transect for establishing baseline conditions.

- Dominant species - 90 percent of the revegetation consists of species included in the seed mix and/or occurs in the surrounding natural vegetation, or as deemed desirable by the BLM as measured along the reference transect for establishing baseline conditions.

- Erosion condition/soil surface factor - erosion condition of the reclaimed areas is equal to or in better condition than that measured for the reference transect for establishing baseline conditions.

4.0 METHODS

4.1 Drill Site, Access Road, and Pipeline Clearing and Topsoil Removal and Storage

In general, topsoil should be handled separately from subsoil materials. At all construction sites, topsoil should be stripped and salvaged to provide for sufficient quantities to be respread to a depth of at least four to six inches (or more if readily available on-site) over the disturbed areas to be reclaimed. In areas where deep soils exist (such as floodplains and drainage channel terraces), at least 12 inches of topsoil should be salvaged. Where soils are shallow to bedrock or have a stony subsoil, topsoil should be salvaged as specified by the AO. Topsoil should be stockpiled separately from subsoil materials. Topsoil salvaged from drill sites and stored for more than one year (under unusual circumstances) should be transported to a specified location at the margin of these sites, graded to a depth not greater than 24 inches to maintain topsoil viability, seeded with a prescribed seed mixture, and covered with mulch for protection from wind and water erosion and to discourage the invasion of weeds. Topsoil should be stockpiled separately from other earth materials to preclude contamination or mixing and should be marked with signs and identified on Construction and Design plans. Runoff should be diverted around topsoil stockpiles to minimize erosion of topsoil materials. In most cases, disturbances will be reclaimed within one year. Therefore, it is unlikely that topsoil stockpiling for more than one year will be required. Salvaged topsoil from roads and drill sites will be respread over cut-and-fill surfaces not actively used during the production phase. Upon final reclamation at the end of the project life, topsoil spread on these surfaces will be used for the overall reclamation effort.

Operators are finding out that it is not always necessary to remove all vegetation and strip all topsoil within a pipeline ROW except over the area of the trench where soil and subsoil has been excavated. Topsoil up to 12 inches deep should be removed, salvaged, and respread over the excavated trench area. In many areas, such as with deep soils on relatively flat smooth slopes with low gradients, it is possible to crush in-place rather than clear vegetation and leave topsoil in-place rather than blade and stockpile. This technique would reduce the magnitude and severity of disturbance impacts and hasten successful reclamation.

In federal jurisdictional wetland areas, vegetation should be cut off only to the ground level, leaving existing root systems intact. Cut vegetation should be removed from wetland areas for disposal. Grading activities should be limited to directly over pipeline trenches and access roads. At least 12 inches of topsoil should be salvaged and replaced except in areas with standing water or saturated soils. Use of construction equipment in wetland areas should be limited. Dirt, rockfill, or brush riprap should not be used to stabilize pipeline ROWs. If standing water or saturated soils are present, wide-track or balloon-tire construction equipment should be used or normal construction equipment should be operated on equipment pads or geotextile fabric overlain with gravel fill. Equipment pads etc., should be removed immediately upon completion of construction activities. Trench spoil should be placed at least 10 feet away from drainage channel banks for all minor and major drainage channel crossings.

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4.2 Drill Site, Access Road, and Pipeline Construction

4.2.1 Upland Areas

Uplands include all areas away from wetlands and alluvial bottomlands or other areas that have excess soil moisture for prolonged periods or have shallow water tables. Construction should be accomplished following site-specific Construction and Design plans and applicable agency specifications. At drill sites, and along the areas of access roads or pipelines traversing steep slopes, slope angles should be minimized to enhance retention of topsoil, and reduce erosion as well as facilitate revegetation, and subsequent reclamation success. Slope stabilizing revetment structures may be necessary in areas where the substrata materials are unconsolidated and loose and cannot be stabilized with revegetation and mulch.

Surface runoff should be controlled at all well sites through the use of interception ditches and berms. A berm approximately 18 inches high should be constructed around fill portions of these well sites to control and contain all surface runoff generated or fuel or petroleum product spills on the pad surface. Water contained on the drill pads should be treated in a detention pond prior to discharge into undisturbed areas in the same manner as discussed previously. This system should also serve to capture fuel and chemical spills, should they occur.

Erosion and sedimentation control measures and structures, as approved by the AO, should be installed on all disturbed areas. Soil erosion control should be accomplished on sites in highly erosive soils and steep areas, as needed, with mulching, netting, tackifiers, hydromulch, matting, and excelsior. The type of control measure should depend on slope gradients and the susceptibility of soil to wind and water erosion. Silt fences should be placed at the base of all steep fill slopes and sensitive disturbed areas. All runoff and erosion control structures should be inspected periodically, cleaned out, and maintained in functional condition throughout the duration of construction and drilling. Water bars should be constructed on cut-and-fill slopes exceeding 25 feet long and 10 percent gradient using the water bar spacing guidelines and procedures specified for access road and pipeline ROW runoff and erosion control.

Runoff and erosion control along access road/pipeline ROWs should be accomplished by implementing standard cross drain, culvert, road ditch, and turnout design as well as timely mulching and revegetation of exposed cut, fill, and road shoulders. All culverts should be constructed with riprapped entrances and exits and with energy dissipators or other scour- reducing techniques as needed and where appropriate. Water discharged from culverts, cross drains, road ditches and turnouts should be directed into undisturbed vegetation away from all natural drainages. Erosion and sedimentation control measures and structures, as approved by the AO, should be installed across all cut-and-fill slopes within 100 feet of drainage channels. All runoff and erosion control structures should be inspected after major runoff events and at a regular schedule. If found to be sub-standard, these structures should be cleaned out and maintained in functional condition throughout the life of the project.

4.2.2 Drainage Channel Crossings

Construction of all drainage channel crossings should minimize the disturbance to drainage channels and wetlands to the extent practicable and should occur during the low runoff period (June 15 through March 1), or as directed by the AO. Staging areas, if used for a given crossing, should be limited in size to the minimum necessary and should be located at least 50 feet from drainage channel bottoms (or greater if in wetlands), where topographic conditions permit. Drainage channel crossings should be constructed as perpendicular to the axis of the drainage channel and at the narrowest positions as engineering and routing conditions permit. Clean gravel should be used for the upper one foot of fill over the backfilled pipeline trenches in perennial and intermittent streams. Silt fences or other sediment filtering devices such as weed-free straw bales should be installed at drainage channel banks where sedimentation is excessive and at the base of all slopes adjacent to wetlands.

Trench plugs should be employed during pipeline construction at non-flumed drainage crossings to prevent diversion of drainage channel flows into upland portions of pipeline trenches during construction. Application of riprap should be limited to areas where flow conditions prevent vegetative stabilization; riprap activities must comply with COE permit requirements. Pipeline trenches should be dewatered in such a manner that no silt laden water flows into active drainage channels (i.e., prior to discharge the water will be filtered through a silt fence, weed-free straw bales, or allowed to settle in a sediment detention pond).

After the completion of construction, all areas where soil has been disturbed that are not part of the actual road should be revegetated according to the revegetation specifications subsequently described. Where vegetation is disturbed, temporary sediment barriers such as silt fences and/or staked weed-free straw bales should be installed along the topographic contour at the base of the slope adjacent to the road crossing. Temporary sediment barriers should remain in-place until permanent revegetation measures have been judged successful by the AO.

4.2.3 Wetlands and Alluvial Bottomlands

Access roads and pipelines should be rerouted, and drill sites located, to avoid these areas to the maximum extent practicable. RMP management directives require a set back of 500 feet of live streams, lakes, reservoirs, and canals and associated riparian habitat; 500 feet of water wells; 660 feet of springs or artesian and flowing wells; and 200 feet of intermittent and ephemeral streams. The size of staging areas should be limited to the minimum necessary and all staging areas should be located out of these areas unless such avoidance is not practicable. Where avoidance is not practicable, staging areas should be located at least 50 feet from the edge of wetland areas, where topographic conditions permit. The width of the access road and pipeline construction ROW should be limited to no more than 50 feet. Hazardous materials should not be stored and equipment should not be refueled within 100 feet of wetland boundaries. Appropriate permits should be secured from the COE prior to any construction activities in federal jurisdictional wetland areas.

4.3 Surface Runoff and Erosion Control

4.3.1 Drill Site, Access Road, and Pipeline Right-of-Way

4.3.1.1 Temporary Reclamation

Temporary erosion control measures, where needed, may include application of mulch and netting of biodegradable erosion control blankets stapled firmly to the soil surface, respreading scalped vegetation, construction of water bars, application of soil stabilizers or tackifiers, use of a standing crop of an annual grain (e.g., sterile barley), or other procedures as directed by the AO. See Final Reclamation measures for specific information pertaining to mulching.

The actual distance of a pipeline/road ROW requiring stabilization on each side of a drainage channel should be determined on a site-specific basis as directed by the AO. To minimize sedimentation of drainage channels and wetlands during the interim period between construction activity and final reclamation, temporary erosion and sediment control measures should be applied. Silt fences or other sediment filtering devices such as weed-free straw bales should be installed at drainage channel banks where sedimentation is excessive and at the base of all slopes adjacent to wetlands. These structures should be keyed into the soil to prevent surface water from going under or around the structure. This includes excavating a shallow trench and burying the bottom of the structures. Where straw bales are used, they should be reinforced by pounding re-bar through the bales and into the soil. Figure A-2 presents schematics of water bar and silt fence construction. Sediment filtering devices should be cleaned out and maintained in functional condition throughout the life of the project. To avoid the possibility of mulching materials entering waterways, loose mulch (i.e., mulch not crimped into the soil surface, tackified, or incorporated into erosion control blankets) should not be applied to drainage channel banks.

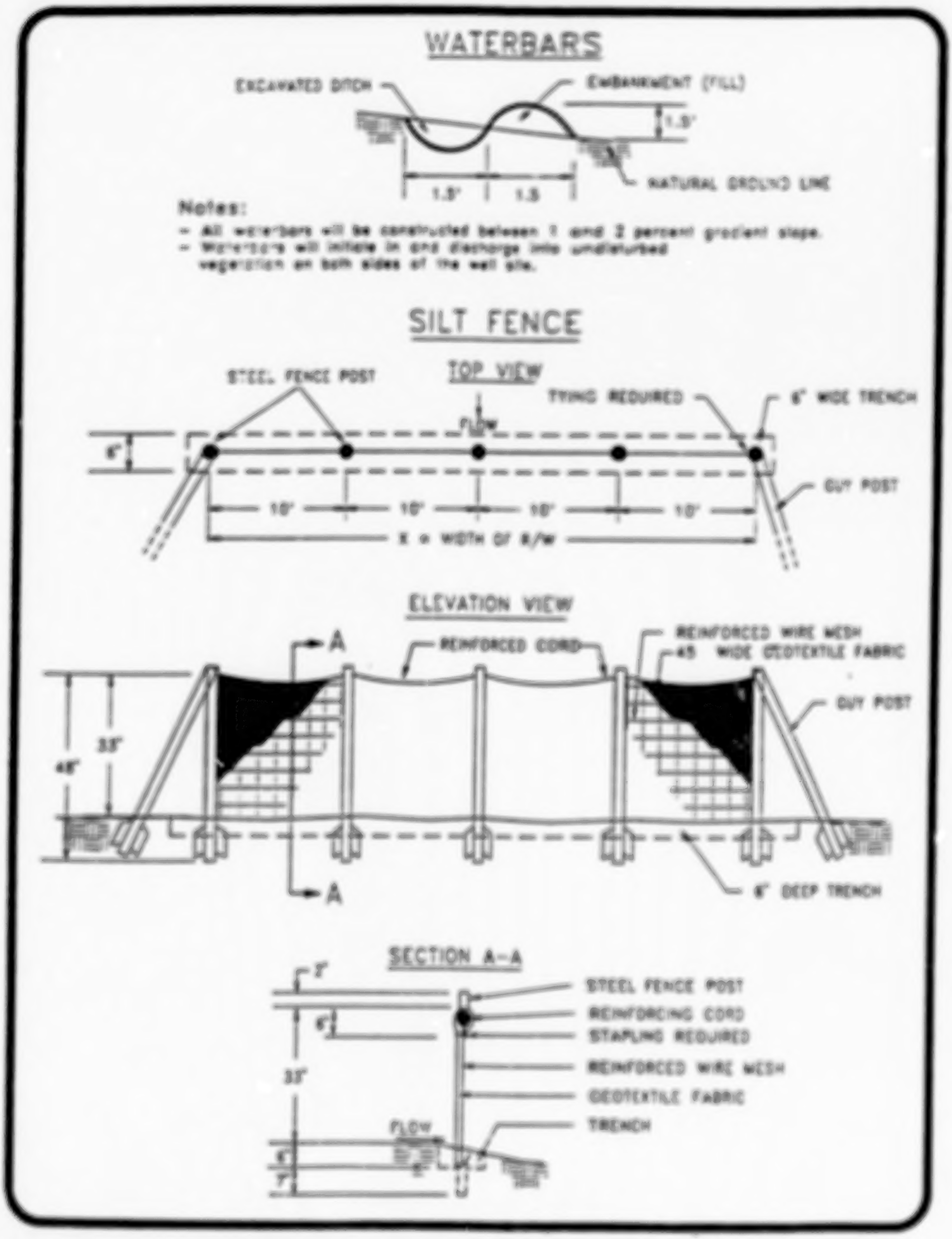
If construction is completed prior to the specified seeding season for perennial vegetation, areas adjacent to the larger drainage channels should be covered with jute matting for a minimum of 50 feet on either side of the drainage channel. In addition, to protect soil from raindrop impact and subsequent erosion, 2.0 tons/acre of a weed-free straw mulch should be applied to all slopes greater than 10 percent. Temporary erosion control measures may include leaving the ROW in a roughened condition, respreading scalped vegetation, or applying mulch as specified by the AO.

As indicated by several operators and the BLM, weed-free straw mulch is difficult to obtain in quantities and at costs suitable for all reclamation applications. Although this circumstance could reduce the application of the measure, the effectiveness of mulch in protecting the exposed soil from raindrop impact, erosion, and off-site sedimentation should not be ignored. As discussed in the Soils, Water, and Vegetation Resources Technical Report (ECOTONE 1997), the effective application of mulch can reduce soil erosion by as much as 900 percent. In addition to its effectiveness in erosion control, mulching also benefits the soil as a plant growth medium in most cases. Therefore, effective mulching is fundamental to reducing soil erosion to acceptable, non-significant levels.

Trench breakers should be used for pipeline construction in certain areas to prevent the flow of water in either a trench that has been backfilled or temporarily left open. Trench breakers are particularly important in wetland areas to minimize subsurface drainage. Trench breakers should be constructed such that the bottom of one breaker is at the same elevation as the top of the next breaker down slope, or every 50 feet, whichever is greater. Factors that control the application of trench breakers include the proximity to drainage channels and wetland areas, slope gradient, proximity of areas to shallow groundwater, and surface runoff source areas that can discharge water into the trench. Trench breakers should be installed, where necessary, as directed by the AO. Topsoil should not be used to construct trench breakers.

If a pipeline crosses roads at the base of slopes, vegetative strips should be maintained. If vegetation is disturbed within these limits, temporary sediment barriers such as silt fences and/or staked weed-free straw bales should be installed at the base of the slope adjacent to the road

Figure A-2. Water Bar Construction and Silt Fence Construction.



Notes:
- All waterbars will be constructed between 1 and 2 percent gradient slope.
- Waterbars will initiate in and discharge into undisturbed vegetation on both sides of the well site.

crossing. Temporary sediment barriers should remain in-place until permanent revegetation measures have been judged successful by the AO.

4.3.1.2 Final Reclamation

4.3.1.2.1 Upland Areas

Runoff and erosion control along all ROWs should be accomplished by constructing sediment trapping devices (e.g., silt fences and straw bales) and water bars, as well as by timely mulching and revegetation of exposed disturbed areas. Runoff discharged from water bars should be directed into undisturbed vegetation away from all natural drainages. Erosion and sedimentation control measures and structures, as approved by the AO, should be installed across all cut-and-fill slopes, where needed. All runoff and erosion control structures should be inspected after major runoff events and at a regular schedule. If found to be substandard or ineffective, these structures should be cleaned out and maintained in functional condition until successful revegetation and soil stability is attained.

Water bars should be constructed across sideslopes at appropriate intervals according to slope gradient immediately following recontouring of the disturbed areas. The spacing should depend on whether mulching is applied in conjunction with placement of water bars. Water bars should be maintained in functional condition throughout the life of the project. Should the integrity of the water bar system be disrupted during seeding, water bars should be repaired and broadcast seeded with the seed raked into the soil. Water bars should be constructed according to hillslope topography at the slope gradient intervals as shown in Table A-1, or as directed by the AO or landowner.

Water bars should be constructed 12 to 18 inches deep by digging a small trench and casting the soil material to the downhill side in a row. Each water bar should initiate in undisturbed vegetation upslope or upgradient of the disturbance, traverse the disturbed area at a side hill gradient between one and two percent, and discharge water into undisturbed vegetation on the lower side of the disturbed area. *Particular attention must be given to the construction of water bars to ensure effectiveness. Water bars are frequently constructed perpendicular to disturbances that traverse across slopes resulting in water bars that are oriented up and down slopes. This circumstance results in ineffective water bars or water bars that facilitate surface runoff and erosion rather than provide control.*

Table A-1. Water Bar Intervals According to Slope Gradient[1].

With Mulching		**Without Mulching**	
Slope Gradient (percent)	**Interval (feet)**	**Slope Gradient (percent)**	**Interval (feet)**
10	150	10	100
15	100	15	75
20	50	20	45
30	40	30	40
40	35	40	35
50	30	50	30
>50	30	>50	30

1 - Based on Grah (1989).

4.3.1.2.2 Wetlands and Drainage Channel Crossings

Disturbance to the ephemeral and intermittent drainage channels should be avoided and/or minimized. All channel crossings not maintained for access roads should be restored to near predisturbance conditions. Drainage channel bank slope gradients should be regraded to conform with adjacent slope gradients. Channel crossings should be designed to minimize changes in channel geometry and subsequent changes in flow hydraulics. Culverts should be installed for ephemeral and intermittent drainage channel crossings. All drainage channel crossing structures should be designed to carry the 25- to 50-year discharge event as directed by the BLM. Silt fences should be constructed at the base of slopes at all drainage channel crossings. Minor routing variations should be implemented during access road, pipeline, and drill site layout to avoid washes. The area of disturbance in the vicinity of washes should be minimized. Per the RMP, a 500-foot-wide buffer strip of natural vegetation should be maintained between all construction activities and drainage channels.

Trench plugs should be employed at non-flumed drainage crossings to prevent diversion of drainage channel flows into upland portions of pipeline trenches during construction. Application of riprap should be limited to areas where flow conditions prevent vegetative stabilization; riprap activities must comply with COE permit requirements. Pipeline trenches should be dewatered in such a manner that no silt laden water flows into active drainage channels (i.e., prior to discharge the water should be filtered through a silt fence, weed-free straw bales, or allowed to settle in a sediment detention pond).

4.4 Final Reclamation

4.4.1 Topsoil Respreading and Seedbed Preparation

In preparation for seeding, at least four to six inches of topsoil should be evenly respread over the pipeline ROW, staging areas, cut-and-fill surfaces, and all areas of other sites not required for production purposes.

Soil compaction could result from heavy equipment working on disturbed soils prior to revegetation. Therefore, compaction is likely to occur under most situations. Soil compaction can inhibit adequate revegetation of disturbances. Therefore, all disturbances to be revegetated will be ripped to reduce the adverse effect of compaction. A spring tooth harrow equipped with utility or seedbed teeth, or ripper-teeth equipment mounted behind a large tractor, cat, or patrol, as directed by the AO, should be used to loosen the subsoil. The subsoil surface should be left rough. After topsoil has been respread and if it is loose, it should be lightly compacted with a cultipacker or similar implement to provide a firm seedbed. On steep slopes (greater than 40 percent and highly erosive), it may be difficult or impossible to replace topsoil and adequately prepare the seedbed. All disturbed areas should be ripped on 18- to 26-inch spacing and 12 to 16 inches deep. These areas should then be mulched with a hydromulch/seed/tackifier mix. If implemented, erosion control blankets with seed incorporated into the matting should be installed per manufacturer's specifications to enhance soil stabilization.

4.4.2 Seed Application

All disturbed areas should be seeded immediately following the final grading of the topsoil to the approximate original contour, weather and season permitting as discussed below. The seedbed should be prepared to a depth of three to four inches where possible to provide a firm seedbed. If hydroseeding or broadcast seeding is employed, the seedbed should be scarified to ensure good seed-soil contact. After completion of seedbed preparation, the seed mixtures recommended in Tables A-2 through A-6, or a similar mix, as directed by the AO, should be applied according to the pure live seed (PLS) rates and drilling depths specified, to areas along the road and pipeline ROW, staging areas, and unused areas of drill sites that have been retopsoiled.

Seed should be used within 12 months of viability testing. Legume species purchased commercially must have been properly inoculated with nitrogen-fixing bacteria. Seed should be planted in the fall (after September 31) or no later than late fall (mid-November) prior to snow accumulation to avoid seed germination and breaking of dormancy and to prevent seedling frost damage; or in early Spring (prior to May 15); or as directed by the AO. Seed should not be applied when soils are frozen or excessively wet. Seed should preferably be planted with drill-type of equipment such as a rangeland drill or brillion seeder where and when possible as directed by the BLM. Where the microtopography of the disturbed areas does not allow drill-type equipment, seed should be broadcast applied at twice the application rate of drilled seed. A spike-toothed harrow or similar equipment should be used where ripping has been insufficient to provide cover for the broadcast seed. Some areas may require the planting of containerized seedlings to speed up successful reclamation particularly in areas of sensitive soils as described in Section 3.5 of the DEIS. Also, some seed is more effectively established by broadcast seeding as apposed to drill seeding such as Wyoming big sagebrush.

Any soil disturbance that occurs outside the recommended permanent seeding season, or any bare soil left unstabilized by vegetation, should be treated as a winter-construction problem and mulching should be considered, or the site stabilized and/or other actions taken as otherwise directed by the AO.

The seed mixtures presented in Tables A-2 through A-6, or similar mixtures as specified by the AO, should be applied according to specific areas identified to be homogeneous in terms of overall ecosystem similarities such as precipitation zones, elevational zones, dominant species herbaceous cover, soil types, and inherent limitations in reclamation success potential. Various vegetation cover types in the project area are described in Chapter 3 of the EIS and in the Soils, Water, and Vegetation Resources Technical Report (ECOTONE 1997).

These seed mixes were developed based on the following criteria: (1) site-specific conditions of the analysis area; (2) species/cultivar adaptation to site conditions; (3) usefulness of species in rapid site stabilization; (4) species success in revegetation efforts; (5) current seed costs and availability; and (6) compliance with Executive Order 11987. Only native species are included in these seed mixes in compliance with Executive Order 11987 and BLM reclamation policy. Certain introduced cultivars have been developed that have utility in site stabilization and revegetation. These species should only be considered if a revegetation or reclamation failure has occurred. The Operators should coordinate with the BLM AO in regard to approval of the use of introduced species in the reclamation effort. Final seed mixes applied in the revegetation effort should be designed in coordination with the BLM during the APD[/Sundry Notice/ROW] approval process.

Table A-2. Recommended Seed Mixture[1] #2 - Vegetated Sand Dune Vegetation Cover Type.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls[2] lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Prairie sandreed (*Calamovilfa longifolia*)	Goshen	3.0	0.5
Bluebunch wheatgrass (*Agropyron spicatum*)	Secar	2.0	0.5
Sand dropseed (*Sporobolus cryptandrus*)	-	1.0	0.25
Indian ricegrass (*Oryzopsis hymenoides*)	Nezpar	3.0	0.5
Needle-and-Thread (*Stipa comata*)	-	2.0	0.5
Forbs			
Gooseberryleaf globemallow (*Sphaeralcea grossulariaefolia*)	-	1.0	0.5
Desert Indian paintbrush (*Castilleja chromosa*)	-	1.0	0.25
Northern sweetvetch (*Hedysarum boreale*)	-	1.0	0.5
Shrubs			
Wyoming big sagebrush (*Artemisia tridentata*)	-	0.5	0.25
Rubber rabbitbrush (*Chrysothamnus nauseosus*)	-	1.0	0.25
Spiny hopsage (*Grayia spinosa*)	-	1.0	0.5
Douglas rabbitbrush (*Chrysothamnus vicidiflorus*)	-	1.0	0.5
TOTAL		17.5	

1 - Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

2 - PLS = pure live seed.

Final determination of the appropriate seed mixture should be developed on a site-specific basis at the time of field review of the facility. Seeding rates may be varied to enhance the probability for maintaining the natural balance of species. Watershed protection must be emphasized when reclaiming disturbed areas. The composition of rare and native species, if encountered at a disturbed site, should be taken into consideration at the time of seeding; however, appropriate measures must be taken to ensure that an adequate protection of the soil surface is obtained.

Areas not exhibiting successful revegetation (as determined by the AO or Environmental Inspector) should be reseeded and/or improved with soil amendments deemed necessary by the AO until an adequate cover of vegetation is established.

State, private, and agricultural lands should be seeded according to the landowner's request. Should the landowner not specify a recommended seed mixture, the AO should determine the appropriate seed mixture to apply.

Table A-3. Recommended Seed Mixture[1] #3 - Alkali Scrub Cover Type.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls[2] lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Sandberg bluegrass (*Poa sandbergii*)	-	2.0	0.5
Western wheatgrass (*Agropyron smithii*)	Rosanna	2.0	0.5
Alkaligrass (*Puccinellia distans*)	Fults	3.0	0.5
Alkali sacaton (*Sporobolus airoides*)	Salado	3.0	0.5
Forbs			
Gooseberryleaf globemallow (*Sphaeralcea grossulariaefolia*)	-	1.0	0.5
Northern sweetvetch (*Hedysarum boreale*)	-	2.0	0.5
Shrubs			
Spiny hopsage (*Grayia spinosa*)	-	1.0	0.5
Winterfat (*Ceratoides lanata*)	-	1.0	0.5
Gardner saltbush (*Atriplex gardneri*)	-	1.0	0.5
Black greasewood (*Sarcobatus vermiculatus*)	-	1.0	0.5
TOTAL		**17.0**	

1 - Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

2 - PLS = pure live seed.

Table A-4. Recommended Seed Mixture[1] #4 - Badlands Cover Type.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls[2] lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Sheep fescue (*Festuca ovina*)	Covar	3.0	0.5
Bottlebrush squirreltail (*Sitanion hystrix*)	-	3.0	0.5
Alkali sacaton (*Sporobolus airoides*)	Salado	3.0	0.5
Forbs			
Gooseberryleaf globemallow (*Sphaeralcea grossulariaefolia*)	-	1.0	0.5
Northern sweetvetch (*Hedysarum boreale*)	-	2.0	0.5
Shrubs			
Spiny hopsage (*Grayia spinosa*)	-	1.0	0.5
Winterfat (*Ceratoides lanata*)	-	1.0	0.5
Gardner saltbush (*Atriplex gardneri*)	-	1.0	0.5
TOTAL		**15.0**	

1 - Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

2 - PLS = pure live seed.

Table A-5. Recommended Seed Mixture[1] #5 - Wet Meadow Cover Type.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls[2] lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Nebraska sedge (*Carex nebrascensis*)	-	2.0	0.5
Redtop (*Agrostis stolonifera*)	-	2.0	0.5
Bluejoint reedgrass (*Calamagrostis canadensis*)	Sourdough	2.0	0.25
Tufted hairgrass (*Deschampsia cespitosa*)	-	4.0	0.25
Forbs			
Northern sweetvetch (*Hedysarum boreale*)	-	2.0	0.5
Blue-leaf aster (*Aster glaucodes*)	-	1.0	0.5
Golden banner (*Thermopsis montanus*)	-	2.0	0.5
TOTAL		**15.0**	

1 - Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

2 - PLS = pure live seed.

Table A-6. Seed Mixture[1] #6 - Marsh Cover Type.

Species	Cultivar or Variety	Seed Application Broadcase Rate (PLS[2] lbs/ac))	Planting Depth (inches)
Grasses:			
Bluejoint reedgrass (*Calamagrostis canadensis*)	-	3.0	0.5
American sloughgrass (*Beckmannia syzigachne*)	Egan	4.0	0.25
GRAMINOIDS:			
Beaked sedge (*Carex rostrata*)	-	2.0	0.5
Alkali bulrush (*Scirpus maritima*)	-	2.0	0.5
Cattail (*Typha latifolia*)	-	0.5	0.25
TOTAL		**11.5**	

1 - Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, current seed availability and cost, and specific project objectives.

2 - PLS = pure live seed.

4.4.3 Mulching

In sensitive sites where significant erosion (e.g., large areas of disturbance or areas with high erosion rates) is most likely to occur, the seeded access road/pipeline ROW, staging areas, and the portion of the drill pads not needed for production purposes should be mulched following seeding to protect the soil from wind and water erosion, raindrop impact, surface runoff, and noxious weed invasion, and to hold the seed in place. The exposed surface of disturbed areas, including topsoil stockpiles, may be protected by placing crimped straw mulch, hydromulch, biodegradable plastic netting and matting, or biodegradable erosion control blankets.

All sensitive disturbed areas should be mulched immediately following seeding with 1.5 to 2.0 tons/acre of a weed-free straw mulch. Mulching materials should be reasonably free of noxious and undesirable plant species as defined by state or county lists. Hay mulch may be used, but it should be applied only if cost-competitive and if crimped into the soil. Straw mulch is more desirable than hay mulch because it is generally less palatable to feral horses, wildlife, and livestock. Additionally, there tends to be a higher risk of introducing undesirable species and noxious weeds with a hay mulch such as smooth brome, timothy, orchardgrass and other minor species. The lessee should maintain all disturbances relatively weed-free for the life of the project through implementation of a noxious weed monitoring and eradication program.

Wherever utilized, mulch should be spread uniformly so that at least 75 percent of the soil surface is covered. If a mulch blower is used, the straw strands should not be shredded less than eight inches in length to allow effective anchoring. On slopes less than 30 percent, straw mulch should be applied by a mechanical mulch blower at a rate of 2.0 tons/acre after seeding. The mulch should be crimped into the soil surface using a serrated disc crimper or similar implement as directed by the AO. Where broadcast straw mulch is applied on windswept slopes, a biodegradable plastic netting should be staked firmly to the soil surface over the mulch following the manufacturer's specifications. On slopes in excess of 40 percent or on slopes exceeding the operating capabilities of machinery, hydromulch or biodegradable erosion control blankets with seed incorporated into the netting should be applied and staked firmly to the soil surface.

Where utilized, hydromulch and tackifier should be applied at a rate of 1,500 lbs/acre or as otherwise approved by the AO. In general, erosion control and soil stabilization are directly related to the amount of mulch applied. Under certain conditions where degradation processes are slow (e.g., in extremely hot or cold dry climates), a trade-off between the degree of effectiveness of mulch and long-term degradation should be considered. In extremely dry areas where mulch degradation may be slow, mulching rates should be reduced to 1.0 to 1.5 tons/acre or as specified by the AO. Special measures may need to be implemented in areas with sandy soils.

On steeper slopes with highly erodible, shallow, rocky soils and/or on windswept areas with loose, unconsolidated materials, the above recommended measures may not be sufficient to reduce erosion to non-significant levels. The following measure should be considered by the operator and the BLM to stabilize such sites: incorporating a custom blend of seed into erosion control blankets. This method has proven cost-effective in many cases, with 98 percent of the cost being the blanket itself. The additional cost of incorporating seed into the blanket will average $1.00 to $1.50 per blanket, depending upon current seed costs. In most cases, this additional cost should offset the repeated efforts of broadcast seeding, manual raking of seeds into the soil, and mobilizing a labor force to remediate unsuccessful revegetation. The AO should determine the final measure(s) to be implemented in such areas.

4.4.4 Livestock Control

Livestock grazing should be monitored along all areas of drill sites and access road and pipeline ROW. Should grazing negatively impact revegetation success, measures should be taken to immediately remove livestock from the newly reclaimed areas. Such measures could include herding, placement of mineral blocks, provision of water sources, and fencing. It would be cost infeasible to fence linear facilities (e.g., pipelines and roads). However, drill sites could be fenced. Depending upon site-specific evaluations, it may be necessary to temporarily fence off certain riparian areas and wetlands to prevent excessive livestock grazing and trampling to enhance drainage channel bank stabilization and overall revegetation success. Livestock control structures such as fences and cattleguards [constructed in conjunction with development] should be maintained in functional condition during all phases of the project. Where road access requires the disruption of an existing fence, a cattleguard should be installed at the juncture.

4.4.5 Off-Road Vehicle Control

Off-road vehicle control measures should be installed and maintained as specified by the AO and landowners following the completion of seeding. Examples of measures include a deep trench; a locking, heavy steel gate with fencing extending a reasonable distance to prevent bypassing the gate, with appropriate signs posted; a slash barrier; a pipe barrier; placement of large boulders; or signs posted at all points of access at intervals not to exceed 2,000 feet indicating "This Area Seeded for Wildlife Benefits and Erosion Control." Operators should monitor the use of pipeline alignments for adverse use and if degradation or damage of the revegetation effort is identified, appropriate remediation should be applied in consultation with the BLM.

4.4.6 Fugitive Dust Control

Should fugitive dust generated during construction of the drill sites, access road/pipeline ROWs, or staging areas become a problem, dust abatement measures should be implemented. Such procedures should be determined by the AO and could include applying water or water with additives (e.g., magnesium chloride) to the construction area at regular intervals, placement of gravel on traveled surfaces, placement of mulch and/or matting, or as directed by the AO.

4.5 Monitoring and Maintenance

Reclamation success should be monitored both in the short term (temporary reclamation) and in the long term (final reclamation). Monitoring of temporary reclamation measures should include visual observations of soil stability, condition, and effectiveness of mulching and runoff and erosion control measures and a quantitative and qualitative evaluation of revegetation success, where appropriate. Long-term reclamation monitoring should include visual observations of soil stability, condition of the effectiveness of mulching and runoff and erosion control measures, and a quantitative and qualitative evaluation of revegetation success.

Revegetation success should be determined through monitoring and evaluation of percent ground cover to include a measure of vegetal cover (by species), litter/mulch, rock/gravel, and bare ground. Ground cover should be documented at each 1-foot interval along a 100-foot line intercept transect. Seedling density and relative abundance should be determined by selection of plots at the 20-, 40-, 60-, and 80-foot marks on the transect. Grazing impacts should be assessed as an ocular estimate of the percent utilization along the transect.

Soil stability should be measured using an erosion condition class/soil surface factor rating method to numerically rate soil movement, surface litter, surface rock, pedestalling, flow patterns, and rill-gully formation. Information obtained through this rating system represents an expression of current erosion activity and can be used to reflect revegetation success as a function of soil stability. [The "Erosion Evaluation" table and guidelines are presented in following section 4.5.5.]

The access road boundaries, pipelines, and unused portions of the drill sites should be monitored until released by the AO upon attainment of 80 percent of predisturbance vegetative cover within five years of seeding. This standard should include 90 percent of the vegetative cover being comprised of desirable species and the erosion condition of the reclaimed area being equal to or in better condition than predisturbance conditions as prescribed under the Performance Standards, section 3.0 of this appendix.

4.5.3 Wetland and Drainage Channel Crossings

Wetland areas and natural drainage channel crossings should be monitored for a minimum of three years for noxious weed invasion and establishment of undesirable species. Noxious weeds should not be allowed to establish at any time. If found in a reclaimed wetland or drainage channel crossing, the noxious weeds should be removed. Undesirable species should not be allowed to establish. At the third year of monitoring, undesirable species should comprise no more than 15 percent of the total vegetation cover. The lessee should maintain wetland areas and drainage channel crossings according to this standard throughout the development of a noxious weed and undesirable species monitoring and eradication program. [Should noxious weeds be found during monitoring, control and eradication efforts should be implemented following County control procedures (DEIS section 4.5.5, page 4-49).]

4.5.4 Photomonitoring

Permanent photomonitoring points should be established at appropriate vantage locations that provide adequate visual access to drill sites, along pipeline and access road rights-of-way, and to ancillary facilities. Each photomonitoring point should be permanently marked with re-bar and identified on a topographic map of the area. The location of each point should be described in detail to assist in relocation from year to year. Photos should be taken at each photomonitoring point prior to initiation of construction. Photos, framing the same scene as previously taken, should be taken each formal visit until reclamation standards have been met.

4.5.5 Reclamation Performance Monitoring Guidelines

Objectives

The general purpose of this plan is to initiate a systematic, documented approach to monitoring existing and future reclamation of surface disturbance. This includes evaluation of methods to assist in making future land management decisions. More specific objectives include the following:

1. To outline agency and company responsibilities in regard to implementation of monitoring.
2. To provide guidelines for documenting site-specific information and monitoring procedures, methods and objectives.
3. To outline methods for monitoring progress and evaluating success of reclamation efforts.
4. To increase probability of the reclamation success on future projects.

Responsibility

Federal agency decisions generally establish the requirement for a formal monitoring program to evaluate the progress of revegetation and reclamation. This, along with soil erosion monitoring (through review of reclamation efforts and mass movement), is the responsibility of both agencies and companies involved with disturbance. This is to be accomplished through a joint, coordinated monitoring effort.

The following is a proposed outline of agency/company responsibility regarding implementation of the Revegetation, Reclamation and Erosion Monitoring Plan.

1. As part of the Erosion, Revegetation and Restoration Plan (ERRP), BLM and/or industry will submit an "initial" monitoring plan covering the extent of disturbance. This plan constitutes the Implementation Phase of monitoring and will follow the guidelines presented under "FORM I" of this report. Monitoring locations, timeframes and methodology will be agreed upon before acceptance of the Surface Use Plan (ERRP - pt. 10) by the agency. The monitoring will be installed by a designated "qualified" representative of the company (in coordination with the appropriate agency) immediately following initial rehabilitation work. This monitoring will be re-examined by the above representative at the end of the first growing season, with results documented in a report (see "FORM II") to the appropriate agency. Problem areas identified in this report will receive follow-up rehabilitation/erosion control measures.
2. During the second growing season, the designated agency personnel will revisit these established monitoring sites. Original methodology will be repeated and status of reclamation efforts assessed using the guidelines established in the FORM II of this report (Establishment Phase). Results will be documented in a project file (computer disk) and a report will be prepared. The monitoring results will be provided to each company or Operator, to show progress and call attention to additional stabilization/reclamation needs. Additional monitoring sites will be established by agency personnel (in coordination with the

company) for "long term" monitoring on significant problem areas not covered by initial efforts.

3. Follow-up monitoring using the established sites and methodology will be accomplished by agency personnel annually, until reclamation goals are attained (see Criteria for Success). When this occurs, the monitoring site will be abandoned, however reference points will remain to allow potential future evaluation. Abandonment is expected on most sites within approximately 3 years. This will allow personnel to concentrate on monitoring installation and evaluation on "long term" problem sites. Companies will be advised to reclamation status through joint review of monitoring sites. Annual reports will continue, as will direction for additional remedial reclamation efforts if necessary.

4. The aforementioned proposal, applies to surface disturbances occurring after the finalization of the decision document. For disturbances existing before this time, the appropriate agency is responsible for initiation and follow-up monitoring, utilizing guidelines proposed in this report.

5. The last phase involves the final review and report on status. Generally, reclamation success in the decision document will be based on specific site potential. Revegetation objectives and success criteria (FORM I) will be tailored to site potential and agreed upon by both company and agencies. When the site has reached long term stabilization and the composition of desired forage is consistent with the above objectives and criteria, the monitoring site will be abandoned. At this point, data will be compiled (by the agency involved) in an effort to provide future direction for successful reclamation. Suggested successful reclamation methods will be provided in the annual report.

Monitoring Guidelines

The following form records are guidelines for covering the collection of site specific information, identification of revegetation objectives, documentation of treatments and a record for evaluation.

FORM I (*Reclamation and Erosion Monitoring; Background Data*) is the initial step in the monitoring process. The monitoring plan contained in the ERRP should cover the parameters outlined on this form, and the representative who will collect this data. It is suggested this background be collected immediately following initial reclamation work. A report containing this information will be prepared, prior to the annual review. Data collection (except for reference plot) will be accomplished by use of point sampling transects conducted within the right-of-way boundaries. These transects will be established with permanent stakes on the locations described in the ERRP.

FORM II (*Revegetation Evaluation*) is considered the annual monitoring, to be conducted by the company (for the first growing season) and agencies (annually until monitoring abandonment). It is suggested to take place during the seed ripe stage of plant development. A evaluation report containing this information will be prepared prior to the annual review. Data collection (except for reference plot) will be accomplished by use of point sampling transects conducted within the right-of-way boundaries. These transects will be established with permanent stakes on the locations described in the ERRP.

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FORM I
Revegetation and Erosion Monitoring: Background Data

A. Revegetation Project Name: ______________________________

Company: ______________________ Telephone No: ( ) ____________

Data collected by: ______________________ (Company/Agency Representative)

Monitoring Site Number: ______________________________

B. Legal Location	C. Slope %_____	D. Key Species in Reference Vegetation
Twp. _____	Aspect _____	____________________ - _____ %
Rng. _____	Elevation _____	____________________ - _____ %
Sec. _____	(include construction	____________________ - _____ %
Sub. _____	map with transect	____________________ - _____ %
	site marked)	____________________ - _____ %
		____________________ - _____ %

E. Soil: Texture - Rock Content

0-6" _______ - _____ %

6-12" _______ - _____ %

Texture - Rock Content

12-18" _______ - _____ %

18-24" _______ - _____ %

F. Disturbance Description: Date ______________________________

____

G. Revegetation Objective(s): ______________________________

____

____

H. Criteria for Determining Success: ______________________________

____

____

I. Reclamation Treatment Record - Date/season applied: ______________

1. Topsoiling: ______________________________

____

2. Erosion Control (type and method of installation): ______________

____

3. Soil Amendments (type, amount, and method of application): ______________

____

4. Seed Mix (lbs pure live seed/acre by species): ______________

____

____

5. Mulch (type and method of application): ______________

____

____

6. Mechanical treatments (type and rationale): ______________

____

____

7. Remarks: ______________________________

____

J. Attach a 35 mm photograph of the monitoring transect and reference plot (if applicable) with dates. Photograph sites should be clearly marked on a reference map.

FORM II

Revegetation and Erosion Monitoring Evaluation

A. Revegetation Project Name: ______________________________

Company: ______________________ Telephone No: ( ) ______________

Data collected by: ______________________ (Company/Agency Representative)

Monitoring Site Number: ______________________________

B. Revegetation Evaluation:

1. Percent Cover	2. Dominant Species	Relative - Percent
_____ % Plant	______________________	- _____
_____ % Litter	______________________	- _____
_____ % Rock	______________________	- _____
_____ % Bare Ground	______________________	- _____
_____ % Water	______________________	- _____
100 % Total	______________________	- _____
	______________________	- _____
	______________________	- _____
	______________________	- _____
	______________________	- _____

3. Seedling Density & Abundance

______________: Average plants per linear ft. (drill row/transect)

______________: Rating

4. Grazing Impact (Utilization)

______________: Utilization

______________: Rating

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PAGE

EROSION EVALUATION: Evaluate conditions 50 feet on either side of transect line. Assign a numerical rating for each category.

SURFACE LITTER	No movement, or if present, less than 2 percent of the litter has been translocated and redeposited against obstacles 0 or 3	Between 2 and 10 percent of the litter has been translocated and redeposited against obstacles 6	Between 10 and 25 percent of the litter has been translocated and redeposited against obstacles 8	Between 25 and 50 percent of the litter has been translocated and redeposited against obstacles 11	More than 50 percent of the litter has been translocated and redeposited against obstacles 14
SURFACE ROCK MOVEMENT	No movement, or if present, less than 2 percent of the surface rock fragments have been translocated and/or redeposited against obstacles and show an even distribution on the landscape 0 or 2	Between 2 and 10 percent of the surface rock fragments have been translocated/redeposited against obstacles and begun to show localized concentration 5	Between 10 and 25 percent of the surface rock fragments have been translocated, redeposited against obstacles, and show localized concentration 8	Between 25 and 50 percent of the surface rock fragments have been translocated, redeposited against obstacles, and show localized concentration 11	More than 50 percent of the surface rock fragments have been translocated, deposited against obstacles, and show extreme localized concentration 14
PEDESTALLING	Pedestals are mostly less than 0.1 in. (2.5 mm) high and/or less frequent that 2 pedestals per 100 ft² 0 or 3	Pedestals are mostly between 0.1 to 0.3 in. (2.5 to 8 mm) high and/or have a frequency of 2 to 5 pedestals per 100 ft² 6	Pedestals are mostly between 0.3 and 0.6 in. (8 to 15 mm) high and/or have a frequency of 5 to 7 pedestals per 100 yd² 9	Pedestals are mostly between 0.6 to 1 in. (15 to 25 mm) high and/or have a frequency of 1 to 10 pedestals per 100 ft² 12	Pedestals are mostly over 1 in. (25 mm) high and/or have a frequency of over 10 pedestals per 100 ft² 14
FLOW PATTERNS	None, or if present, less than 2 percent of the surface area shows evidence of recent translocation and deposition of soil and litter 0 or 3	Between 2 and 10 percent of the surface area shows evidence of recent translocation and deposition of soil and litter 6	Between 10 and 25 percent of the surface area shows evidence of recent translocation and deposition of soil and litter 9	Between 25 and 50 percent of the surface area shows evidence of recent translocation and deposition of soil and litter 12	Over 50 percent of the surface area shows evidence of recent translocation and deposition of soil and litter 15
RILLS	Rills, if present, are mostly less than 0.5 in. (13 m) deep, and generally at infrequent intervals over 10 ft. 0 or 3	Rills are mostly 0.5 to 1 in. (13 to 25 mm) deep and generally at infrequent intervals over 10 ft. 6	Rills are mostly 1 to 1.5 in. (25 to 38 mm) deep and generally at 10-ft. intervals 9	Rills are mostly 1.5 to 3 in. (38 to 76 mm) deep and at intervals of 5 to 10 ft. 12	Rills are mostly 3 to 6 inches (76 to 152) deep and at intervals of less than 5 ft. 14
GULLIES	No gullies, or if present, less than 2 percent of the channel bed and walls show active erosion (are not vegetated), gullies make up less than 2 percent of the total area 0 or 3	Between 2 and 5 percent of the channel bed and walls show active erosion (are not vegetated), or gullies make up between 2 and 5 percent of the total area 6	Between 5 and 10 percent of the channel bed and walls shows active erosion (are not vegetated), or gullies make up between 5 and 10 percent of the total area 9	Between 10 to 50 percent of the channel bed and walls show active erosion (are not vegetated), or gullies make up between 10 to 50 percent of the total area 12	Over 50 percent of the channel bed and walls show active erosion (are not vegetated) along their length, or gullies make up over 50 percent of the total area 15
SOIL MOVEMENT	Depth of recent deposits around obstacles or in microterraces, and/or depth of truncated areas, is between 0 and 0.1 in. (0 to 2.5 mm) 0 or 3	Depth of recent deposits around obstacles or in microterraces, and/or depth of truncated areas, is between 0.1 and 0.2 in. (2.5 to 5 mm) 5	Depth of recent deposits around obstacles or in microterraces, and/or depth of truncated areas, is between 0.2 and 0.4 in. (5 to 10 mm) 8	Depth of recent deposits around obstacles or in microterraces, and/or depth of truncated areas, is between 0.4 and 0.8 in (10 to 20 cm) 11	Depth of recent deposits around obstacles or in microterraces, and/or depth of truncated areas, is over 0.8 in. (20 cm) 14

Erosion Condition Class: ______________ Soil Surface Factor: ______________

APPENDIX A

Methodology

Most items listed in the guidelines of FORM I and FORM II are self-explanatory. Those that require a detailed explanation of methods and ratings are listed herein.

FORM I

B. A 1:24,000 topographic map can be used to attain this information. This report should include the monitoring site transect location on the detailed construction drawings contained in the ERRP.

D. Reference vegetation serves as a standard of comparison to assess potential species for revegetation and success. The nature of comparisons with reference vegetation will depend on revegetation objectives. A reference plot location will be established on-the-ground and marked on the ERRP map. A 35 mm photo of the plot will accompany the report.

G. Soil stability, productivity restoration, and wildlife habitat enhancement are general examples of objectives.

H. Examples of Criteria for Success could include 60 percent groundcover for erosion control, soil surface factor of less than 45, specific diversity requirements for wildlife habitat, and specific production for livestock grazing. Criteria must be defined and measurable.

I. The reclamation treatment record should document what was actually done on-the-ground not necessarily what is outlined in ERRP. Short explanations on which topsoiling was completed, the erosion control methods used, fertilizes type and rate, seed mix by lbs/species, mulching methods, etc. should be described in this section. Any additional erosion control measures, should be included under remarks.

J. A photo record (35mm - 50mm lens) of the transect line from point A to point B, and any additional erosion control measures, should be included in the report. Each transect should have one photo showing the general view along the transect and one photo showing transect detail of the vegetation/soil surface. Photos should be properly labeled for date, transect, and direction of view.

FORM II

B.1. Percent cover is determined by examination of 100 points along a 100 foot transect. Documentation consists of recording the total number of "hits" for plant, litter, rock and bare ground. Each point noted, corresponds to every foot increment on the 100 foot tape. Data summarized from this transect is recorded here.

B.2. Dominant vegetative species along the transect are listed and their relative percent composition determined based on the number of "hits" for each species.

B.3. Seedling Density and Relative Abundance. Total number of plants is rated by selection of plots at the 20-, 40-, 60-, and 80-foot mark on the transect. At these points, perennial seedlings per linear foot or drill row (or in the case of broadcast seedling, per linear foot of transect) are recorded and averaged. Ratings are based on the evaluation system in the following table:

PLANTS/LINEAR FOOT	RATING
8+	Excellent
5-7	Good
3-4	Fair
0-2	Poor

B.4. The grazing impact is assessed as an ocular estimate of the percent utilization along the cover transect (at 10-foot intervals). Utilization of revegetation efforts is based on the removal of "seeded" grasses (current year's growth) by grazing. The amount of utilization is expressed in percent of above ground biomass which is grazed. The following table describes the ratings for various utilization ranges:

PERCENT UTILIZATION RANGE	RATING	GENERAL DESCRIPTION
1-40	Light	The revegetation may be topped, skimmed or grazed in patches, 60 to 80 percent of the number of current seed stalks remain intact. Most young plants are undamaged. Little or no use of non-palatable species.
44-60	Moderate	The revegetation appears entirely covered (grazed) as uniformly as natural features and facilities will allow. 15 to 25 percent of the number of current seed stalks remain intact. No more than 10 percent of the non-palatable species are utilized.
61-100	Heavy	The revegetation has the appearance of complete and repeated grazing use. Less than 10 percent of the current seed stalks are remaining. The remaining stubble of preferred grasses may be grazed to the soil surface.

C. The Erosion Condition Class/Soil Surface Factor method numerically rates soil movement, surface litter, surface rock, pedestalling, flow patterns and rill-gully formation and translates these physical factors into an evaluation of the vegetation and erosion stability of an area. Results are an expression of current erosion activity, and can be used to reflect revegetation success as a function of site stability.

Identify the numerical factor that most nearly describes the current erosion condition by circling the factors. Evaluate each erosional feature if water erosion is the **most prevalent** type of erosion. (Omit surface rock if not present.) If wind erosion is mostly prevalent, do not include the rill and gully features in the computation. The following table identifies the Erosion Condition Class based on the Soil Surface Factor:

EROSION CONDITION CLASS	SOIL SURFACE FACTOR (Range)
Stable	1-20
Slight	21-40
Moderate	41-60
Critical	61-80
Severe	81-100

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APPENDIX B

RAPTOR MANAGEMENT AND MONITORING PLAN
CAVE GULCH - BULLFROG - WALTMAN
NATURAL GAS DEVELOPMENT PROJECT

APPENDIX B

RAPTOR MANAGEMENT AND MONITORING PLAN

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APPENDIX B

RAPTOR MANAGEMENT AND MONITORING PLAN
Cave Gulch - Bullfrog - Waltman

1.0 PURPOSE AND GOALS

This raptor management and monitoring plan (RMMP) has been developed for application to the Cave Gulch - Bullfrog - Waltman gas/oil field development proposed by the Cave Gulch Operators. The purpose of this plan is: (1) to provide the means to enable managers to avoid and minimize impacts to raptors, (2) to mitigate impacts that do occur through measures designed to maintain the long-term breeding raptor population in the region at a level comparable to that which would have occurred in the absence of the field development, and (3) to document the effectiveness of the mitigation and monitoring plan.

2.0 METHODS

2.1 Avoidance and Minimization of Impacts on the Project Area

2.1.1 Instruction of Personnel

All project workers will be instructed about the nature of raptor species that occur on the project area, potential impacts to these species, and measures that can be taken to avoid or minimize impacts. They will also be advised of federal and state regulations and laws concerning harassment and illegal kill of raptor species.

2.1.2 Power Line Crossarms

If above-ground power lines are installed, power pole cross arms will be configured by the owner of the power line according to specifications described in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996 (Avian Power Line Interaction Committee)* so as to eliminate the potential for raptor electrocution.

2.1.3. Seasonal Restrictions

Seasonal restrictions of construction activities within 1/4 mile of occupied raptor nests will be applied. An occupied nest is defined as one where eggs or young are being incubated or tended. Occupied nests will be protected during the nesting period until the young have safely fledged. Normally the exclusionary time window for nesting activities extends from February 1 through July 31 for golden eagles and from March 15 through July 31 for other species. The AO may modify these dates depending on the specific circumstances surrounding individual nests.

Seasonal restrictions will be applied as follows:

- Any activity initiated prior to February 1 may be completely finished. This means a well may be permitted (casual uses), drilled, completed, and hooked up without restrictions unless activities on the drill site cease for 3 weeks or longer between February 1 and June 1. In the event of such prolonged inactivity, a nest survey must be performed in the 1/4-mile radius surrounding the drill site to determine whether or not an occupied nest has been established during the period of inactivity. If an occupied nest is found, the operation must temporarily cease until the young have fledged.

- Any activity initiated between February 1 and June 1 will require a nest check by BLM or the Operator representatives approved by the BLM within 1/4 mile; if an occupied nest is present, activity would be restricted during the critical period.

2.1.4. Casual Use

Casual uses include, but are not limited to, ground activities such as: (1) preliminary scouting of routes or sites, (2) land surveying and staking, and (3) cultural and wildlife surveys. Because casual use is generally not treated as a managed or permitted activity, there is a potential for causing impacts to nesting raptors. Measures that can be taken to minimize or avoid potential impacts are outlined below:

- Casual use activities away from existing roads and facilities that are scheduled to occur between March 1 and mid-June should be coordinated with the BLM in order to obtain current information about raptor nests in the area.

- If an adult raptor is flushed from a nest, particularly when eggs or very young birds are present, it is extremely important to get away from the nest area immediately so that the adult may quickly return to the nest to incubate the eggs or to shelter the very young birds. During the first few weeks after hatching, raptor chicks are unable to thermoregulate their body temperature and must have an adult on the nest in order to stay warm. The danger to exposed eggs or young is greater when temperatures are cold (less then 60 degrees F) or hot (greater than 90 degrees F), and when it is raining or snowing. Winds in excess of 10 mph, combined with cold temperatures or precipitation, increase the potential for losses from exposure.

- Operators must immediately report to the BLM raptor nests that are discovered and must not approach them. Employees will be directed not to enter buffer zones, established by the BLM to reduce stress to raptor adults or young and to prevent nest abandonment.

- The discovery of injured or dead raptors or young raptors which have fallen from nests must be reported to the Wyoming Game and Fish Department Game Warden for the Casper area (234-5940 or 473-3400) or the Platte River Resource Area BLM office in Mills (261-7500). Under no circumstances should these birds be approached or handled.

Other general information and guidelines that are pertinent to the management of casual uses so as to minimize potential impacts to nesting raptors include:

- Routine operations and maintenance on existing roads and facilities would cause little or no impacts.
- Early nesting golden eagles may be on eggs as early as the first week of March while late nesting birds may not commence incubation until the last week of May.
- Initiation of incubation by ferruginous hawks may commence as early as the first week of April, and as late as the second week of June.
- Great horned owls nest earlier than golden eagles. Red-tailed hawks and prairie falcons nest within the same approximate time frame as ferruginous hawks.

2.1.5. Unusual Maintenance

There are few facilities now located within the buffer zones of nests that are likely to be occupied. As field development continues, it is likely that progressively fewer nests would become occupied near facilities. In the event that there is an occupied nest near a facility which requires maintenance during the nesting season, the following precaution is provided:

- If Unusual Maintenance is proposed within 1/4-mile of an occupied nest between March 1 and June 15, Operators must contact the PRRA Authorized Officer for prior approval of operations or maintenance which would be "unusual". "Unusual" means extensive or significant operations, such as workover operations or other operations which include loud noise or night-time activity. Emergency (safety) situations are not restricted. The seasonal restriction at any particular occupied nest would be about 60 days, which would protect the raptors from intense disturbance during the periods of egg-laying, incubation and the first two weeks of brooding.

Evaluation of specific requests for prior approval would be based upon the following criteria:

- dates of proposed maintenance activities
- extent of proposed maintenance activities (length of time, number of vehicles and people, noise, daytime vs "round-the-clock" operations)
- stage of nesting (egg-laying, incubating, brooding)
- distance and visual relationship between the nest and the proposed maintenance activities.

2.2. Mitigation

2.2.1. Rationale and Overall Plan

As described in the DEIS, in Section 4.7.3.1.4, from 3 to 7 pairs of nesting raptors are likely to be displaced from the project area during the intensive drilling and construction phase of the project.

In order to avoid the significant impact to raptors that might otherwise occur, the EIS recommended that 14 artificial nesting structures (ANSs) be erected on and proximal to the project area. The rationale for the choice of this procedure as the primary mitigation action is that any losses in raptor production on the project area would be offset or more than offset by the creation of nesting opportunities in areas where they did not previously exist or were very poor.

2.2.2. Justification for ANS Use

The use of ANSs was selected as the primary mitigation agent because of the widespread documentation and demonstrated success of this technique for increasing raptor production in plains areas (Call 1994, Call and Tigner 1991, Gaines 1985, Houston and Scott 1992, Olendorff 1993, Schmutz *et al.* 1984, Schmutz 1989, Smith and Murphy 1978, Stalmaster 1988, Steenhof *et al.* 1993, Wittenhagen 1992).

- Physical description - ANS design and installation will follow the plan developed by Dr. Mayo Call (Raptor Biologist) and described in (Call 1989). In general, a wooden nest platform will be mounted on top of a large diameter (6" to 8") pressure-treated wooden pole approximately 9 to 12 feet above ground. Structures intended for use by golden eagles would be mounted 12 feet above the ground and would follow the general specifications used by Howard Postovit (Raptor Biologist) in the Powder River Basin of Wyoming. Structures intended for use by ferruginous hawks would be mounted at 9 feet above the ground. Wire netting secured to the nest platform will act as an anchor for nesting materials used in constructing a nest.

- Nest materials will consist of sticks collected from decadent sagebrush plants.

- The locations of the 14 ANS sites selected are illustrated in Figure B-1 and the legal descriptions of these sites are set forth in Table B-1.

Table B-1. Locations of Artifical Nesting Structures

Section 34, Twn 38N:Rng 85W	Section 22, Twn 38N:Rng 83W
Section 35, Twn 38N:Rng 85W	Section 35, Twn 38N:Rng 83W
Section 01, Twn 37N:Rng 85W	Section 02, Twn 36N:Rng 83W
Section 27, Twn 37N:Rng 85W	Section 12, Twn 36N:Rng 83W
Section 07, Twn 37N:Rng 84W	Section 14, Twn 36N:Rng 83W
Section 03, Twn 36N:Rng 84W	Section 15, Twn 36N:Rng 83W
Section 13, Twn 38N:Rng 83W	Section 24, Twn 36N:Rng 83W

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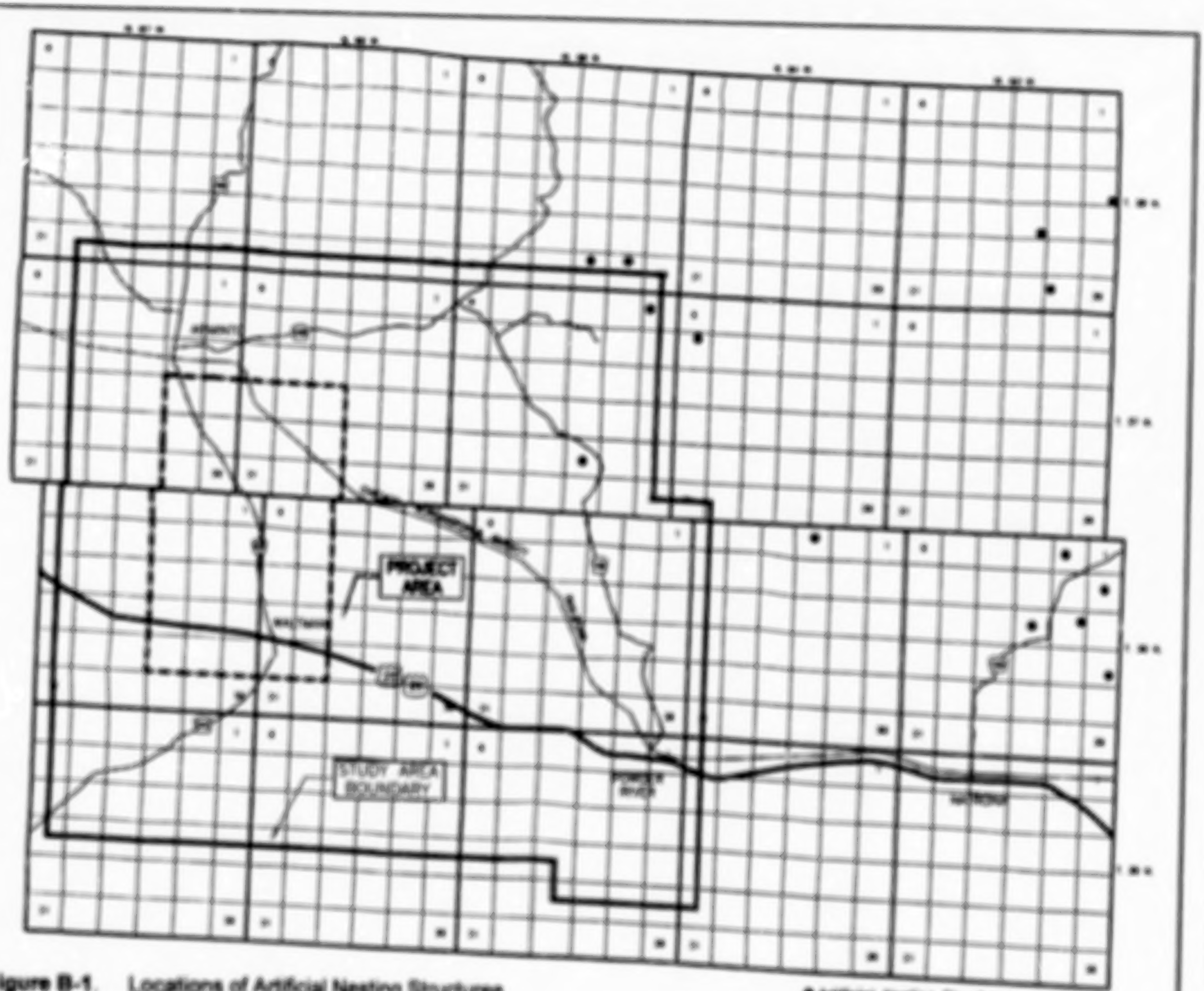

Figure B-1. Locations of Artificial Nesting Structures

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In the selection of sites for ANS placement, opinions and suggestions from coordination/consultation with the U.S. Fish and Wildlife Service and the Wyoming Game and Fish Department were obtained and incorporated into the following list of criteria, sequence of steps, and processes. Site screening and selection was accomplished both in the office and in the field with the use of maps, data, and a helicopter survey. During the helicopter survey sites which had passed initial screening tests in the office were field inspected for other criteria. Sites which made the final cut were staked in the field and photographed from the helicopter.

- Areas of "low potential" for oil and gas development were selected based on analyses and mapping performed by BLM's Wyoming Reservoir Management Group.

- Sites within the areas classified as "low potential" for oil and gas development areas of currently unleased federal mineral and surface estate were selected.

Additional criteria applied to the areas which were screened out according to the two criteria listed above include:

- Twelve ANSs will be located in habitats more suitable to ferruginous hawks than to golden eagles or prairie falcons. Two ANSs will be located in habitats more suitable to golden eagles than to ferruginous hawks or prairie falcons.

- Raptor habitats lacking good natural nest substrates (rock pinnacles, cliffs, trees) will be selected in areas at least 1 mile from known active nests. Raptor habitats where only predator-accessible nests exist are likely to benefit from ANSs. Nests accessible to ground predators include nests located on: (1) the ground, (2) low pillar of rock (less than 6 feet high), (3) stream banks or erosion cuts accessible from either above or below, and (4) higher rock pillars that have an "access ramp" of natural rock leading up to it.

- Specific ANS sites will be selected in areas far removed (at least 1/2 mile) from existing physical facilities that require or undergo frequent visits or use. Such facilities include roads, corrals, oil and gas wells or facilities, mineral quarries, etc. Where possible, ANSs will be placed no closer than 200 feet from two-track trails and fences.

- ANS sites should be accessible to personnel who install and monitor them with access routes preferably not crossing private surface. When or if it is necessary to cross private surface the landowner will be notified.

- Avoid the most sparsely vegetated sites which are the least likely to support prey base for raptors.

- Space ANSs so that they are at least 1 mile apart.

Criterion applied as the result of consultation with the Wyoming Game and Fish Department:

- ANS sites should be outside of known sage grouse nesting habitats (2-mile radius from active leks) and prime brood rearing habitats (draws with riparian habitat).

Criterion applied at the request of the U.S. Fish and Wildlife Service:

- Place ANSs outside of areas with high densities of prairie dogs to avoid potential conflict with black footed ferret. This issue was addressed and resolved during the helicopter reconnaissance.

- ANSs will be installed between the end of the raptor nesting season (July 31) and November 15. If necessary, ANSs can be installed during the raptor nesting season (February 1 - July 31), provided that the activity will not impact other raptors nesting in the area. All 14 ANSs must be installed within 2 years of the signing of the Cave Gulch-Bullfrog-Waltman EIS Record of Decision (ROD).
- Permits
  - A permit from the Wyoming Game and Fish Department is required for the installation of ANSs and will be acquired by the BLM through the appropriate channels.
  - No U.S. Fish and Wildlife Service Permit is required for ANS installation as federal agencies are considered capable of carrying out such action within the appropriate laws (Migratory Bird Treaty Act and the Eagle Protection Act).
- Security of ANS Sites
  - It is the intent of this plan to maintain ANSs in a functional condition for 20 to 40 years or until such time as it can be determined that their maintenance is no longer required or useful.
  - If an ANS is not used for 5 years after placement, or if the site is compromised by an unavoidable disturbance, it will be relocated.
  - Management of the federal mineral and surface lands will be executed so as to avoid disturbances to raptors nesting on the ANSs. The development of site specific restrictions was based on: (1) 1/4 to 1/2-mile No Surface Occupancy (NSO) recommendations from the FWS (2) BLM's standard seasonal restrictions, and (3) information on the biological need and distances required for insulating nesting ferruginous hawks contained in the draft paper entitled *A Review of Literature Concerning the Use of Artificial Nesting Structures by Ferruginous Hawks and Other Raptors (Baldwin and Hayden-Wing 1997)*. Restrictions are as follows:
    - A 1/4-mile NSO radius will be established around each ANS site.

  - In addition to the 1/4-mile NSO radius, a seasonal raptor restriction buffer of up to an additional 1/4-mile will be applied, depending upon line-of-sight distances. If line-of-sight extends 1/2 mile or more from the ANS, the seasonal restriction would extend 1/2 mile beyond the 1/4-mile NSO buffer for a maximum total 1/2-mile buffer.

  - The size of the seasonal raptor restriction radius will be determined by the AO for individual sites at the time proposals for development are received by the BLM.

  - The AO can modify or adjust these restrictions accordingly when or if pertinent information that was previously unavailable, or that he/she was unaware of, becomes available.

  - These restrictions were tailored for and are applicable to this specific project and do not represent a general policy applicable to other projects within the Platte River Resource Area or other BLM lands within the State of Wyoming.

    The restrictions set forth above apply to surface uses including but not limited to: locatable minerals development, oil and gas activities, salable minerals activities, and realty actions. Typical grazing activities would not be of concern but range improvements, except for fences, would not be authorized within NSO zones. Permitted types of recreation use would not be allowed within the NSO zones.

- Maintenance

  ANSs are designed to require very little maintenance. If an ANS becomes unusable, it will be repaired after July 31, but prior to February 1 of the following year. Adherence to seasonal restriction for nesting raptors would be needed for maintenance activities.

- Responsibilities for construction, installation, relocation, and maintenance of ANSs:

  - The BLM is responsible for mitigation to wildlife resources, when the need for mitigation has been documented through the environmental analysis process and decided upon in a decision document. The BLM may require Operators to provide or share in mitigation.

  - The Operators will be responsible for construction, installation, relocation, and maintenance of ANSs through the year 2000, as specified in a signed written agreement which is attached to this RMMP. After the year 2000, the BLM will assume responsibility for construction, installation, relocation, maintenance, and removal if appropriate, of ANSs.

2.3 Monitoring

Monitoring is used to evaluate the effectiveness of mitigation measures, which are intended to minimize the impacts of field development upon raptor nesting. Monitoring also determines the extent to which development is occurring at the pace which was estimated and if the impacts are within the range which was predicted. If monitoring shows that mitigation is not effective, or needs to be changed, the mitigation may be adjusted.

Monitoring of the effectiveness of ANSs and of the population levels, as reflected by nesting densities and productivity of raptor species, are the two primary kinds of monitoring which will be conducted for the Cave Gulch-Bullfrog-Waltman project. The Greater Cave Gulch Raptor Analysis Area (GRAA) was originally the primary target area for placement of ANSs, but it was necessary to extend the area of consideration outside of the GRAA to the east in order to meet the criteria for site selection described in Section 2.2.2 of this appendix. The area in which ANS sites were selected is contiguous with the GRAA (See Figure B-1) and supports raptors of the same general regional populations as found on the GRAA. Monitoring population levels of raptor species will be done for the raptor mitigation area, which includes the GRAA, plus the ANSs outside the GRAA.

In addition to the raptor monitoring they conducted during 1994 through 1997, the Operators have agreed to be responsible for the following raptor monitoring tasks:

Project Area Plus the GRAA

1998

- Helicopter survey for occupied raptor nests in late May to mid-June.
- Survey raptor prey base (rodents) along previously established diurnal walking transects during mid July.
- Survey raptor prey base (rabbits) along previously established diurnal ground walking transects and nocturnal headlight transects during September.

ANS Sites

1997

- Construction and installation of 14 ANSs between August 4 and November 15.

1998, 1999, and 2000

- Helicopter survey to determine occupancy in late-May to mid June.
- Ground survey to determine to determine fledging/production status during early July.
- Establish and stake diurnal walking transects for the purpose of surveying raptor prey base (rodents) during mid-July.
- Establish and stake diurnal walking transects and nocturnal headlight routes for the purpose of surveying raptor prey base (rabbits) during September.

- The methodology, sample sizes, sample locations used in these surveys are described in detail in the *Raptor Technical Report for the Cave Gulch Analysis Area - 1994, 1995, and 1996* (Hayden-Wing Associates 1997).

2.4 Reporting

An annual report on the results of all surveys (as described in Section 2.3 above) conducted during the year will be prepared by the Operators. Such reports will contain only the data collected and will present the results of surveys and monitoring without analysis. These reports will be submitted no later than December 1 each year, including the years 1997 through 2000. Copies of the report will be sent to: BLM Casper District, BLM Platte River Resource Area, Cave Gulch Operators, U.S. Fish and Wildlife Service (Cheyenne), Wyoming Game and Fish Department (Casper), and Wyoming Game and Fish Department (Lander).

3.0 SCHEDULE

1997

- August 4 - November 15 - Construct and install 14 ANSs
- September - Raptor prey base - rabbit surveys on the Project Area and the GRAA
- December 1 - Submit 1997 annual report for surveys on the Project Area and the results of installing ANSs east of the GRAA.

1998

- Late May - mid-June - Helicopter survey of occupied raptor nests on the Project Area, the GRAA, and the ANSs.
- Early July - Ground survey of ANSs to determine fledging/production.
- Mid July - Survey raptor prey base (rodents) along previously established transects on the Project Area/GRAA.
- Mid-July - Establish and stake diurnal walking transects and survey raptor prey base (rodents) in the ANS areas.
- September - Survey raptor prey base (rabbits) along previously established diurnal ground walking transects and nocturnal headlight transects on the Project Area/GRAA.
- September - Establish and stake diurnal walking transects and nocturnal headlight routes and survey raptor prey base (rabbits) in the ANS areas.
- December 1 - Submit 1998 annual report

1999 and 2000

- Late May - mid-June - Helicopter survey of occupied raptor nests on the ANSs.
- Early July - Ground survey of ANSs to determine fledging/production.
- Mid July - Survey raptor prey base (rodents) along previously established transects on the ANS areas.
- September - Survey raptor prey base (rabbits) along previously established diurnal ground walking transects and nocturnal headlight transects on the ANS areas.
- December 1 of 1999 and 2000, respectively, submit annual report.

4.0 EVALUATION

Following completion of surveys in the year 2000, the BLM in coordination with the FWS and the WGFD, will evaluate the effectiveness of the mitigation and determine what worked and what didn't work and why. This evaluation will be completed no later than June of 2001. Such long-term results are likely to be of value to all operators, managers, and biologists in making future decisions regarding the mitigation of raptor impacts.

5.0 LITERATURE CITED

Call, M. W. 1989. Raptor monitoring in the Shamrock Hills: a 1989 monitoring study. Unpublished report. 110pp.

Call, M. W. 1994. Raptor surveys and monitoring in the Shamrock Hills: a 1994 monitoring study. 88pp.

Call, M. W. , and J. R. Tigner. 1991. Abstract: Artificial nest structures for ferruginous hawks in Wyoming. J. Raptor Res. 25:152.

Gaines, R. C. 1985. Nest site selection, habitat utilization, and breeding biology of the ferruginous hawk in central North Dakota. M.S. thesis, N. D. St. Univ., Fargo. 32pp.

Hayden-Wing Associates. 1997. Raptor Technical Report for the Cave Gulch Analysis Area - 1994, 1995, and 1996. Unpublished report. 33 pages plus maps and appendices.

Houston, C. S. , and F. Scott. 1992. The effect of man-made platforms on osprey reproduction at Loon Lake, Saskatchewan. J. Raptor Res. 26:152-158.

Olendorff, R. R. 1993. Status, biology, and management of ferruginous hawks: a review. Raptor Res. and Tech. Asst. Cen., U.S. Dept. Interior, Bur. Land Manage., Boise, ID. 84pp.

Schmutz, J. K., R. W. Fyfe, D. A. Moore, and A. R. Smith. 1984. Artificial nests for ferruginous and Swainson's hawks. J. Wildl. Manage. 48:1009-1013.

Schmutz, J. K. 1989. Management plan for the ferruginous hawk in Canada. Unpubl. Rept. Dept. Biology, Univ. Saskatchewan, Saskatoon. 43pp.

Smith, D. G. , and J. R. Murphy. 1978. Biology of the ferruginous hawk in central Utah. Sociobiology 3:79-98.

Stalmaster, M. V. 1988. Ferruginous hawk nesting mitigation study: final report. Unpublished report. ERO Corp, Denver, CO. 97pp.

Steenhof, K., M. N. Kochert, and J. A. Roppe. 1993. Nesting by raptors and common ravens on electrical transmission line towers. J. Wildl. Manage. 57:271-281.

Wittenhagen, K. W. 1992. 1992 final report on the ferruginous hawk in southeastern Montana. Unpublished report. U.S. Bur. Land Manage., Miles City, MT. 31pp.

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